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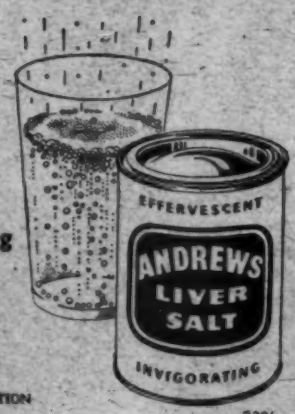

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 20 1954

THE TREATMENT OF SEVERE HYPERTENSION*

BY

M. L. ROSENHEIM, M.A., M.D., F.R.C.P.

Professor of Medicine, University of London; Director of Medical Unit, University College Hospital Medical School

[WITH COLOUR PLATE]

LECTURE I

Of recent years two Oliver-Sharpey lecturers have devoted themselves to the subject of hypertension. In 1943 George Pickering reviewed the circulation in hypertension, while last year Clifford Wilson (1953) discussed renal factors in its production. Both have done much to elucidate the cause and nature of hypertension, and the advances in our knowledge of physiopathology have been, to some extent at least, applied to therapy. A review of the present methods of treatment of severe hypertension may therefore not be out of place. I shall start with a case history.

Case 1.—The patient, a young woman, was quite fit when, in 1942, at the age of 18, she joined the Forces. Her past history was uneventful and there was no family history of hypertension. In 1944 she began to have severe morning headaches and to vomit, and, shortly after, she was admitted to hospital in a series of epileptiform fits. Her blood pressure was about 200/140 mm. Hg, and at that time her optic disks were sharp. She was unconscious for four days, and upon recovery her blood pressure remained raised. Renal function was good. A few months later she was seen by Professor (now Sir) Arthur Ellis, who noted bilateral papilloedema, macular stars, and haemorrhages. At his suggestion an intravenous pyelogram was done, and this showed a normal left kidney, while the right was small but functioning. Invalided from the Forces, she married, and in August, 1945, was delivered of a macerated foetus, her blood pressure after delivery being 176/130 mm. Hg. In April, 1947, her second pregnancy miscarried at four months, her blood pressure being 200/120 mm. Hg.

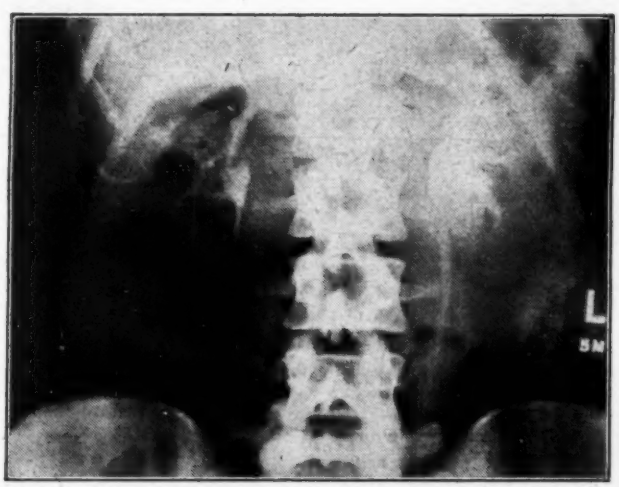

FIG. 1.—Intravenous pyelogram in Case 1, showing large left kidney with small, deformed, but functioning right kidney.

In December, 1947, she was first seen at University College Hospital, 24 weeks advanced in her third pregnancy. Her blood pressure was 180/130 mm. Hg, her fundi showed narrowed arteries, but there were now no papilloedema, haemorrhages, or exudates, and her heart was not enlarged. A macerated foetus was delivered in February, 1948. An intravenous pyelogram showed that the left kidney was considerably larger than normal, the right definitely small but still functioning (Fig. 1). For various reasons she did not, at this time, accept the advice that she should have a nephrectomy, but in March, 1949, she was readmitted in her fourth pregnancy; her blood pressure was then unaltered, and Mr. W. R. Merrington removed her right kidney. There was an immediate and permanent fall in blood pressure. The kidney was small, weighing 50 g., and it showed typical changes of chronic pyelonephritis. Unfortunately the foetus did not survive. Since 1949 the patient has been well. She has had three further pregnancies, all of which were successful and entirely uneventful. When last seen in January, 1954, over nine years after she had entered the malignant phase of hypertension and over four and a half years after neprectomy, her blood pressure was 125/75 mm. Hg, she was the proud mother of two children aged 3 and 1, and was approaching term in her seventh pregnancy. Her history is summarized in Table I.

TABLE I.—*Summary of the History of Case 1*

1942 ..	Age 18	Quite fit. Joined Army.
1944 ..	Age 20	Hypertensive encephalopathy. B.P. 200/140. Malignant hypertension. Papilloedema, haemorrhage, macular stars.
1945 ..	1st Pregnancy ..	B.P. 176/130. Macerated foetus.
1947 ..	2nd Pregnancy ..	B.P. 200/120. Miscarriage 4/12.
1948 ..	3rd Pregnancy ..	B.P. 180/120. Macerated foetus.
1949 ..	4th Pregnancy ..	B.P. 210/130. Foetus died after operation.
	April, 1949; Nephrectomy; Chronic Pyelonephritis	
1950–51	5th Pregnancy ..	B.P. 124/80. Normal pregnancy and delivery.
1953 ..	6th Pregnancy ..	B.P. 124/78. Normal pregnancy and delivery.
1954 ..	7th Pregnancy ..	B.P. 125/75. Normal pregnancy and delivery.

Many lessons can be learnt from this case; the outstanding one is the complete reversal of the train of events which we usually associate with severe hypertension and which have, in the past, been considered irreversible. There was first a spontaneous remission of the malignant features, and then the persistent grossly raised pressure was cured by nephrectomy. The hypertensive process was severe enough to lead to foetal death in three, and perhaps four, successive pregnancies, and no better demonstration of cure could be given than the subsequent occurrence of completely normal pregnancies.

* The Oliver-Sharpey Lectures delivered at the Royal College of Physicians of London on March 16 and 18, 1954.

From among the legion of patients presenting with severe hypertension four groups have now been separated in whom treatment may possibly lead to cure. These are unilateral renal disease, phaeochromocytoma, Cushing's syndrome, and coarctation of the aorta. While all these conditions are rare, the demonstration that hypertension can on occasion be cured, even when of long standing and when the widespread lesions of the malignant phase are present, carries with it the hope that ultimately some curable cause may be found for the more common types of hypertension. It also emphasizes the need for careful consideration of the individual case.

Unilateral Renal Disease

The experimental work of Goldblatt, though not widely applicable to man, focused attention on the possibility of curing hypertension by removal of a diseased kidney. Butler, in 1937, appears to have been the first purposely and successfully to have nephrectomy performed for severe hypertension, and since then a large number of successful cases have been recorded. Ten years later Langley and Platt (1947) analysed 103 cases, including 10 of their own, of unilateral renal disease associated with hypertension in which the diseased kidney had been removed. In 47 of these the raised blood pressure had been relieved. Langley and Platt attempted to define the type of case in which success might be expected. Cure was more probable in patients under the age of 20, though in successful cases the age actually ranged from 2 to 63 years. The hypertension was usually of recent origin, but it had been known to be present for more than two years in nine cases. They were able to show that the presence of a positive family history of hypertension made success unlikely and, conversely, they emphasized the importance of investigating every young patient with severe hypertension in whom there was no family history, in the hope of finding an underlying unilateral renal lesion.

Homer Smith, whose review appeared in 1948, took a pessimistic view. He argued that the incidence of hypertension among patients with urological disease was not abnormally high and that the reported incidence of urological abnormality in hypertensives was also not high. He rightly accepted as cured only those patients in whom the blood pressure returned to normal following nephrectomy and remained normal for at least a year. He accepted only 47 out of 242 recorded nephrectomies as successful, and suggested that a 20% success in selected cases might be fortuitous. Anyone, however, who has seen such a cure must believe that, rare though it may be, unilateral renal disease does sometimes provoke severe hypertension, which may be reversed by nephrectomy.

Homer Smith made no reference to papilloedema, and this can certainly be relieved by nephrectomy in some cases, even though the blood pressure does not return to normal. We have recently seen a woman, aged 58, with a short history of tiredness, dyspnoea, and impaired vision. She was found to be bordering on the malignant phase of hypertension (B.P. 220/140) with normal renal function. On intravenous pyelography, the left kidney was small and only the upper calices appeared to be functioning; the right kidney was normal. Left nephrectomy was performed by Mr. F. J. Barrington in April, 1953. The kidney was small and fibrotic and showed changes suggestive of chronic pyelonephritis. When last seen in January, 1954, though her blood pressure was still raised—175/105 mm. Hg—she felt well and her fundi showed great improvement (Plate, Fig. A).

The commonest renal lesion to be found is chronic pyelonephritis (22/47 in Homer Smith's series), but many other conditions have been reported, including hydro- or pyonephrosis, renal tuberculosis, infarction, ureteric occlusion, and hypernephroma (see Maitland, 1952). Atheromatous occlusion of the orifice of one renal artery may occasionally precipitate severe hypertension, but such cases are rarely operable. Perera and Haelig (1952) have suggested that unilateral renal disease most often produces an acute and severe hypertension, progressing with only a short history to the malignant phase. Pickering and Heptinstall (1953), recording their experience, have recently reviewed the whole problem of nephrectomy for hypertension.

Langley and Platt found that in 33 of 46 successful cases the damaged kidney was functionless. Homer Smith goes so far as to state that before deciding upon its removal the diseased kidney should be shown to be practically without function. I cannot agree with this. Out of 10 patients in whom, since the war, I have advised nephrectomy for hypertension, three can be regarded as cured, and the one who has lost her papilloedema is much improved. In six the operation was a failure. In the four who benefited, intravenous pyelography demonstrated some function in the diseased kidney, in the six failures there was none.

Case 2.—I was asked by Dr. Baber, of Edgware General Hospital, to see a girl of 9 who for the past three months had had headaches and who had been found to have hypertension (140/110), an enlarged heart, and narrowed retinal arteries. The intravenous pyelogram showed a normal left kidney. The upper calices on the right side showed up, but the lower pole appeared functionless and shrunken (Fig. 2). The blood pressure fell after

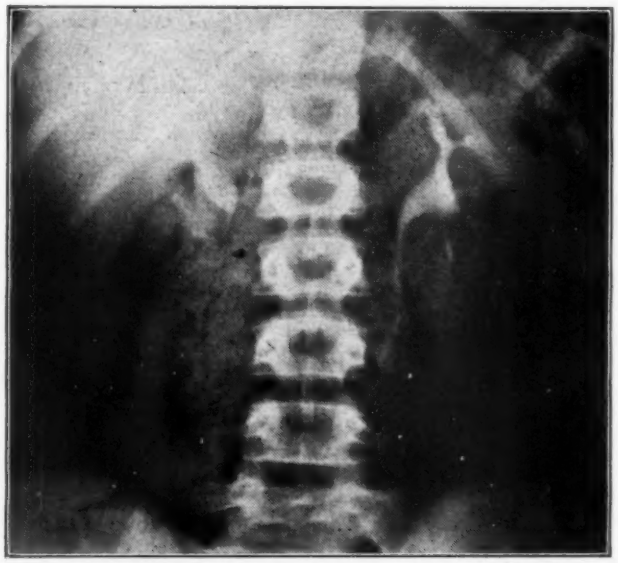

FIG. 2.—Intravenous pyelogram in Case 2, a girl aged 9, showing normal left kidney and functioning but shrunken right kidney.

nephrectomy and was still normal 11 months later. The kidney showed pyelonephritis localized to one pole. This area showed the typical histological picture, while elsewhere the kidney appeared relatively normal. How small an area of disease can precipitate hypertension remains to be determined.

Case 3.—The third patient who improved markedly, a girl of 11, was admitted under Dr. Bernard Schlesinger in the malignant phase of hypertension (B.P. 210/118) with severe headaches and vomiting, nocturia, and haematuria. Her fundi showed papilloedema, haemorrhages, and exudates. Investigation showed a normal right kidney, and a functioning left kidney although it gave a poor shadow on intravenous pyelography. On ureteric catheterization it excreted a urine containing only 0.24 g. of urea per 100 ml., compared with 1.62 g. in the right ureteric specimen. The left kidney was removed by Mr. W. R. Merrington; it was small (12 g.), was hypoplastic, and showed chronic pyelonephritis, mainly at the upper pole. When last seen, 1½ years after nephrectomy, her blood pressure was 140/100, her disks were normal, and she was fit and leading a perfectly normal life at school.

I would emphasize the point that the diseased kidney may be functioning. Urologists rightly like to preserve functioning renal tissue, and may require persuasion before they will remove a kidney that is causing no local trouble and is still doing useful work. The primary renal lesion in these cases, whatever it may be, may be compared to a small hypernephroma, malignant in the more usual sense and

sure to lead to fatal widespread disease. The sacrifice of normal renal tissue surrounding such a lesion is never questioned.

Because it is important not to miss cases that might be cured by nephrectomy, intravenous pyelography should be done in all patients with severe hypertension and normal renal function unless there is some obvious cause for the blood pressure. One must, not infrequently, advise nephrectomy in the hope of cure and be disappointed in the outcome. This appears inevitable. Failure is almost certainly due to one of three causes : there may be undetected coexistent pyelonephritis in the opposite kidney, secondary arteriolar damage may have occurred in the sound kidney setting up the vicious circle envisaged by Wilson and Byrom (1941), or the hypertension may have been unconnected with the renal lesion. A point of great interest, which must be answered in the future, is why some people with undoubted pyelonephritis and shrunken kidneys do not develop hypertension.

The other forms of curable hypertension are as rare as, or even rarer than, cases due to unilateral renal disease. Coarctation of the aorta must always be suspected in a child or young adult with hypertension, and the femoral pulses be palpated. Operation on the aorta now holds out a good promise of restoration of blood pressure to normal. Recently the severe hypertension that accompanies the adrenal cortical hyperplasia of Cushing's syndrome has been treated by bilateral total or subtotal adrenalectomy. This will not be discussed further now, since adrenalectomy in hypertension is reviewed later.

Phaeochromocytoma

Although George Oliver first showed with Schäfer, in 1894 (Oliver and Schäfer, 1895) that extracts of the adrenal medulla contained a substance that raised the blood pressure in animals, it was not until 1922 that the clinical picture of paroxysmal hypertension associated with a functioning tumour of the adrenal medulla was described (Labbé, Tinel, and Doumer). Our knowledge about these tumours has advanced greatly during the past decade, for several reasons. The pharmacology of the syndrome has been clarified by the recognition of the important part played by noradrenaline, a variety of methods for the detection of the tumours have been described, and their surgical removal has become both simpler and safer.

It was originally thought that a phaeochromocytoma always produced paroxysms of hypertension, but it is now clear that persistent or sustained hypertension, often malignant in character, may occur (Green, 1946 ; Goldenberg *et al.*, 1950 ; Swan, 1951). These tumours may present in a variety of ways ; the hypertension may be persistent and severe or it may be paroxysmal, and in either case it may or may not be accompanied by evidence of other systemic features such as sweating, fever, a raised basal metabolic rate, and glycosuria. It may be possible to feel confident of the diagnosis on clinical grounds alone, but many cases closely mimic the severe benign or malignant phases of essential hypertension, and can be differentiated from them only by pharmacological studies. In order to avoid missing cases which may be cured by operation, a screening test is required that is simple, reliable, and safe.

It was only in 1945 that the first pharmacological test for the presence of a phaeochromocytoma was introduced. This was the use of histamine (Roth and Kvale, 1945). During the next few years a series of such tests became popular (Entwisle *et al.*, 1951 ; Evans *et al.*, 1951). Some drugs, such as histamine, mecholyl, and tetraethyl ammonium salts, provoke a hypertensive crisis by direct or reflex stimulation of the adrenals with liberation of adrenaline and noradrenaline. Such tests have been used in the non-hypertensive phase of the paroxysmal case, but they do not always precipitate an attack, and, if they do, such a crisis may be severe. The other tests consist of the injection of drugs which antagonize the peripheral action of the circulating amines. Benzodioxane, dibenamine, and phentolamine (" rogitine ") have all been widely used as a test in hypertensive patients (Goldenberg *et al.*, 1947), but again are not completely reliable. False positives and false negatives have been reported. Benzodioxane is somewhat dangerous, for I have seen it precipitate pulmonary oedema in patients with essential hypertension. Phentolamine is now regarded as the most reliable of these drugs (Gifford, Roth, and Kvale, 1952 ; Cahill, 1953).

Although Barger and Dale described the pharmacological properties of noradrenaline in 1910, relatively little attention was paid to this substance either by physiologists or by clinicians until, in 1946, von Euler demonstrated its presence in the tissues. Intensive study of its pharmacology followed, and marked differences between its action and that of adrenaline were noted (Goldenberg *et al.*, 1948 ; Swan, 1949 ; Barcroft and Konzett, 1949 ; von Euler, 1951a ; Goldenberg, 1951). In small doses, noradrenaline causes a marked generalized vasoconstriction with increase in the total peripheral resistance and little or no change in cardiac output. It does not possess the vasodilator properties of adrenaline and is far less active in increasing metabolism or producing other systemic effects. In fact, the rise of blood pressure occurring on infusion of noradrenaline closely resembles that found in hypertension in man, save that bradycardia may occur.

Noradrenaline can be demonstrated in most organs of the body (von Euler, 1951a) ; and Peart, in 1949, showed that this substance was liberated *in vivo* on stimulation of adrenergic nerves. It is now accepted as the principal chemical mediator of sympathetic action.

Holton in 1949 demonstrated the presence of a large amount of noradrenaline in surgically removed medullary tumours, and since then the work of von Euler and his colleagues has simplified the diagnosis of the condition. They have shown that it is possible to detect the pressor amines in the urine, and in 1950 Engel and von Euler reported two cases in which the diagnosis of phaeochromocytoma was made on finding abnormal amounts of noradrenaline in the urine. They showed, and it has since been confirmed (von Euler, 1951b), that the ratio between the amounts of noradrenaline and adrenaline in the urine varied from case to case, but that there was a clear correlation between the urinary ratio and the ratio of these substances later isolated from the tumour itself. It would appear that, to a large extent, the symptomatology in the individual case depends upon this ratio and upon the tumour size and total content of amines (Goldenberg *et al.*, 1950, 1954).

There are various methods for the detection of the catechol amines in the urine—bioassay, colorimetric, fluorimetric, and chromatographic (Goldenberg, 1951 ; Goldenberg *et al.*, 1954). Differential bioassay remains the most effective though time-consuming method of quantitative determination of mixtures of noradrenaline and adrenaline.

A fluorimetric method for estimating the amines in both blood and urine was introduced by Lund (1950, 1952), and a similar method has been used by Goldenberg and his colleagues (1954). Weil-Malherbe (Weil-Malherbe and Bone, 1952, 1953), in this country, has used a different fluorimetric method, which is apparently reliable, but cannot at present be applied to urine. Fluorimetry is likely soon to replace all biological methods, and the estimation of the amines should then become widely practicable.

The combined output of the pressor amines, in the normal person, amounts to about 50 micrograms a day. In patients with phaeochromocytoma the output is far higher, and figures ranging from 200 to 3,800 micrograms in the 24 hours have been reported (Lund, 1952 ; von Euler, 1952 ; Burn, 1953 ; Goldenberg *et al.*, 1954). An excretion of over 100 micrograms a day or a urine containing more than 0.15 micrograms per ml. is suggestive of a phaeochromocytoma.

In the investigation of a severe case of hypertension, the occurrence of suggestive paroxysmal attacks or the presence of signs of hypermetabolism would naturally lead to a suspicion of an adrenal medullary tumour. It is clear,

however, that in the absence of a clearly defined renal cause for the blood pressure, or a strong family history, such a tumour must be suspected even if the blood pressure is sustained. An estimation of the output of the catechol amines in the urine is probably the surest method now available for confirming or refuting the diagnosis. We are, at present, thus screening all our severe hypertensive patients, but since starting to do so 18 months ago we have examined some 100 selected patients and have found only a single tumour. This is, admittedly, a rare form of hypertension. Graham reported 8 in a series of 1,700 patients operated on for hypertension, an incidence of 0.47%. From his figures he estimated that 600–800 patients died of hypertension due to phaeochromocytoma every year in the United States. The condition is often curable, and must therefore be energetically sought.

The operative removal of a phaeochromocytoma, once diagnosed, is difficult, for a severe hypertensive crisis may follow handling the tumour and irreversible hypotension its removal. The use of adrenolytic drugs in the early stages and of noradrenaline in the later has helped to tide many patients over the operation. The end-results are usually highly satisfactory, with disappearance of the hypertension and of the disk changes of the malignant phase. The removal of the tumour may, however, not lead to normal pressure (Goldenberg *et al.*, 1950; Barnett *et al.*, 1950). It is not uncommon for further tumours to be present (Graham, 1951), while malignant tumours with functioning metastases occur (Bannon and Allen, 1952). These can be detected by the continued excretion of excess noradrenaline and adrenaline in the urine. Even if the excretion of these substances returns to normal, hypertension may still persist (Peart, 1954), probably because of severe secondary arteriolar damage in the kidneys.

If noradrenaline is liberated at sympathetic-nerve endings, it is the agent ultimately responsible for vasoconstriction on sympathetic stimulation. It is of interest, therefore, to speculate on the possible role of this substance in essential hypertension. Goldenberg and his colleagues (1948) suggested that failure of methylation of noradrenaline to adrenaline might allow hypertension to occur. Deficient or abnormal action of the amine oxidase responsible for its local destruction might lead to more persistent vasoconstriction. It has been claimed that injected noradrenaline has a greater pressor effect in hypertensives than in normals (Goldenberg *et al.*, 1948), but further work is required to elucidate this point (Judson *et al.*, 1950), since any comparison must take into account the already heightened tone of the arterioles in the hypertensive. The pressor effect of both noradrenaline and adrenaline in man may be intensified by the previous administration of deoxycortone (Raab *et al.*, 1950) or of adrenocorticotrophic hormone or cortisone (Kurland and Freedberg, 1951). It has also been shown (Fritz and Levine, 1951) that, in rats, adrenal cortical hormones are essential to the maintenance of normal arteriolar tone, and that in their absence these vessels do not respond normally to noradrenaline. It is thus possible that hypertension, in man, may be produced by some humoral or hormonic sensitization of the peripheral vessels to normal sympathetic action.

The Investigation of Severe Hypertension

It might be helpful at this point to discuss how a patient with severe hypertension should be investigated. The major steps by which a diagnosis is made and the various tests which help in the difficult decision of what treatment to adopt are shown in Table II. The history includes, of course, not only the account of the immediate symptoms, but the past history, with special reference to renal disease and a full record of family illness. An account of previous medical examinations, such as for life assurance, may help to date the onset of the hypertension. It may be possible, after the clinical examination that follows, to decide the underlying nature of the hypertension, but its effects on the heart and kidneys require special tests. The discovery of evidence of renal failure not only shows that the prognosis is serious, but rules out an operable unilateral renal lesion as the cause of the hypertension, and sympathectomy or salt restriction in its treatment. Evidence of cardiac involvement also indicates a serious degree of hypertension. When these routine investigations are complete, there may be sufficient suggestive evidence to warrant carrying out the tests for the presence of a phaeochromocytoma, while in the presence of normal renal function intravenous pyelography is usually indicated. If this is abnormal, full urological examination to test the function of either kidney will be needed.

TABLE II.—*The Investigation of a Case of Severe Hypertension*

1. ***History*** (including *family history*).
2. ***Full clinical examination.***
3. ***Renal function***
   (i) Urine (ii) Concentration and dilution.
   (iii) Blood urea. (iv) Urea concentration test.
4. ***Heart:*** *x*-ray; E.C.G.
5. ***Tests for phaeochromocytoma.***
   Urinary assay for pressor amines.
   Benzodioxane or phentolamine test.
6. ***Intravenous pyelography,*** possibly followed by full urological investigation.
7. ***Investigation of hypertension***
   (i) Daily B.P. record; (ii) sedation test; (iii) trial of hypotensive drugs.
8. ***Decision*** as to (i) cause; (ii) treatment.

During this time a daily record of the blood pressure is kept, taken, with the patient resting, at the same time each day by the same observer. A considerable fall in the level of blood pressure, both systolic and diastolic, often occurs during the first days or weeks in hospital. A record of the basal blood pressure, obtained when the patient is asleep, is often a good guide to the severity of the hypertensive process—while tests with hypotensive drugs are a valuable guide to possible treatment.

This routine is, of course, not necessary in every case—for the diagnosis may be clear from the history and examination; but in many cases, especially of severe hypertension of short duration, full investigation is required before a definite diagnosis can be made and the best line of treatment selected.

Essential and Renal Hypertension

Most forms of hypertension in man are, so far, incurable, and before reviewing the available methods of providing symptomatic relief it is necessary briefly to discuss the underlying disturbance of normal physiology.

The chief vascular disturbance in hypertension is an increase in arteriolar tone. Whatever its cause, whether intrinsic, neurogenic, or humoral, this increased tone raises the peripheral resistance to the flow of blood so that normal circulation can be maintained only by a rise in arterial pressure and by increased cardiac work and ultimate left ventricular hypertrophy. The relationship between increased peripheral resistance and increased cardiac work is not understood, but is one of the remarkable features of hypertension in man. In the otherwise healthy hypertensive,

M. L. ROSENHEIM: LEGENDS TO PLATE

FIG. A.—Drawings of the fundus of a woman aged 58 with chronic pyelonephritis before and eight months after nephrectomy.

FIG. B.—Drawings of the fundus of a man aged 28 with chronic nephritis before and one year after bilateral thoraco-lumbar sympathectomy.

FIG. C.—Drawings of the fundus of a man aged 26 with chronic nephritis and uraemia before and after three months' treatment with hexamethonium.

FIG. D.—Drawings of the fundus of a man aged 52 with malignant essential hypertension before and after seven months' treatment with hexamethonium.

FIG. E.—Drawings of the fundus of a man aged 52 with malignant essential hypertension treated by thoraco-lumbar sympathectomy and low-salt diet. Left, November 22, 1948, before sympathectomy; right, August 26, 1953, after low-salt diet.

FIG. F.—Drawings of the fundus of a man aged 47 with malignant essential hypertension before and five months after bilateral total adrenalectomy.

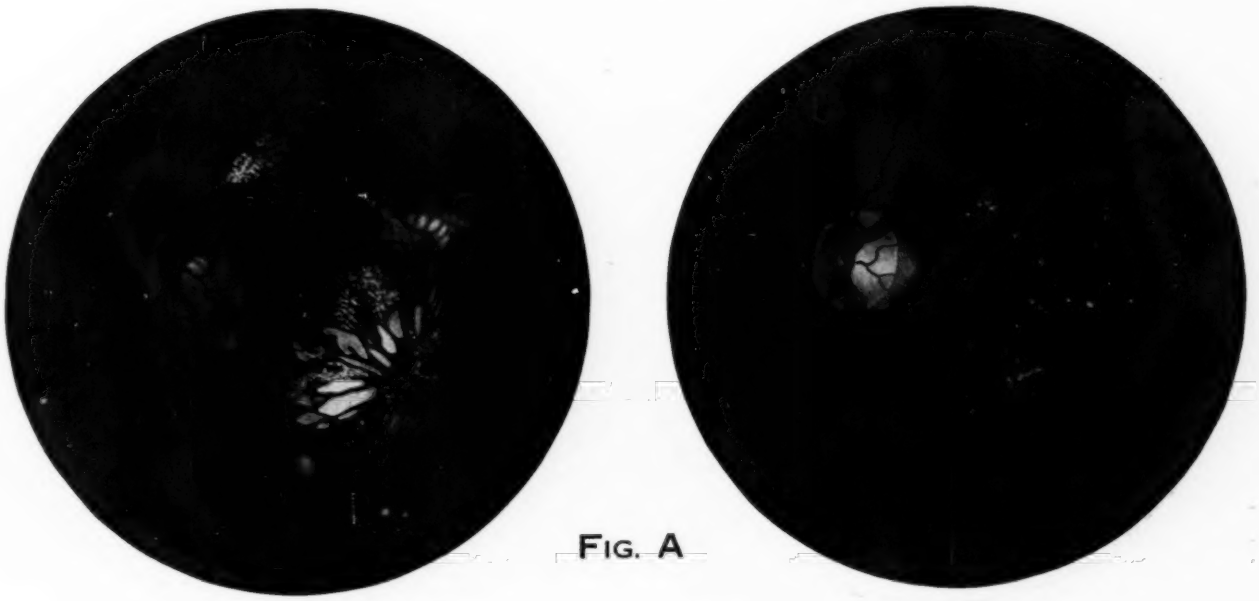

FIG. A

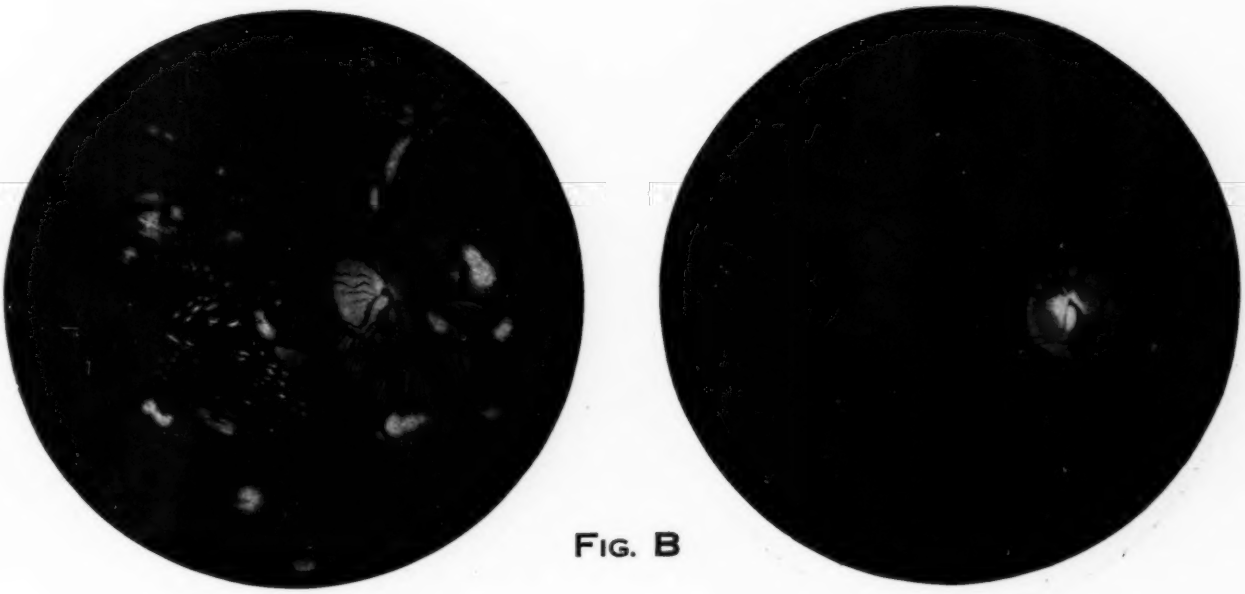

FIG. B

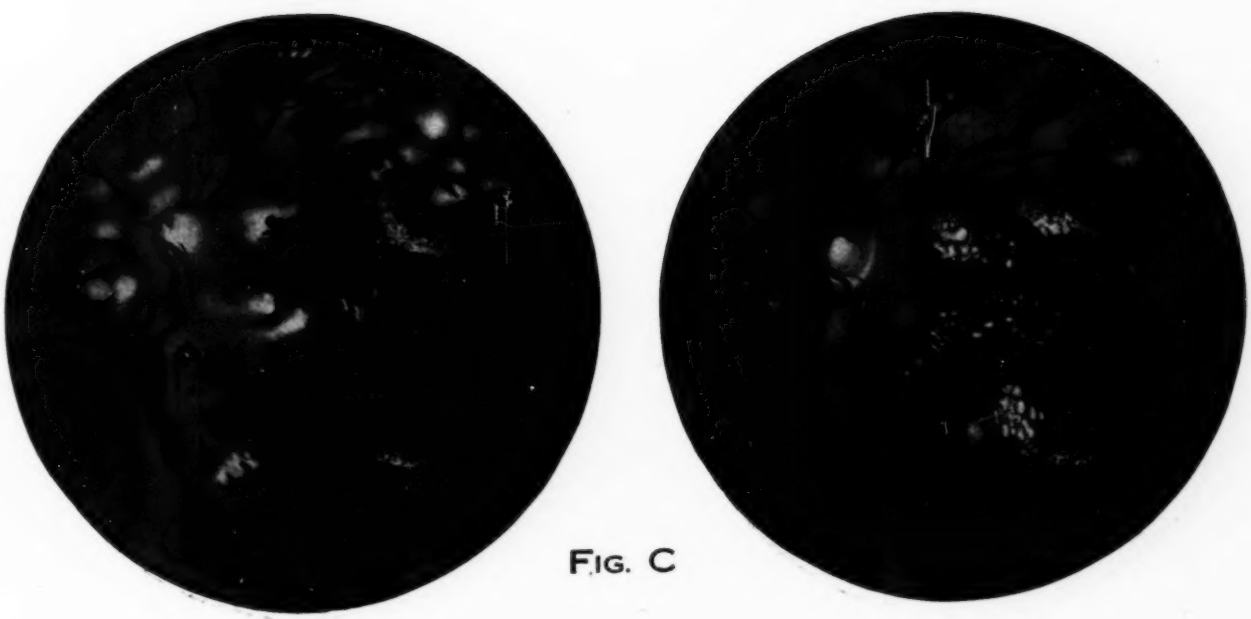

FIG. C

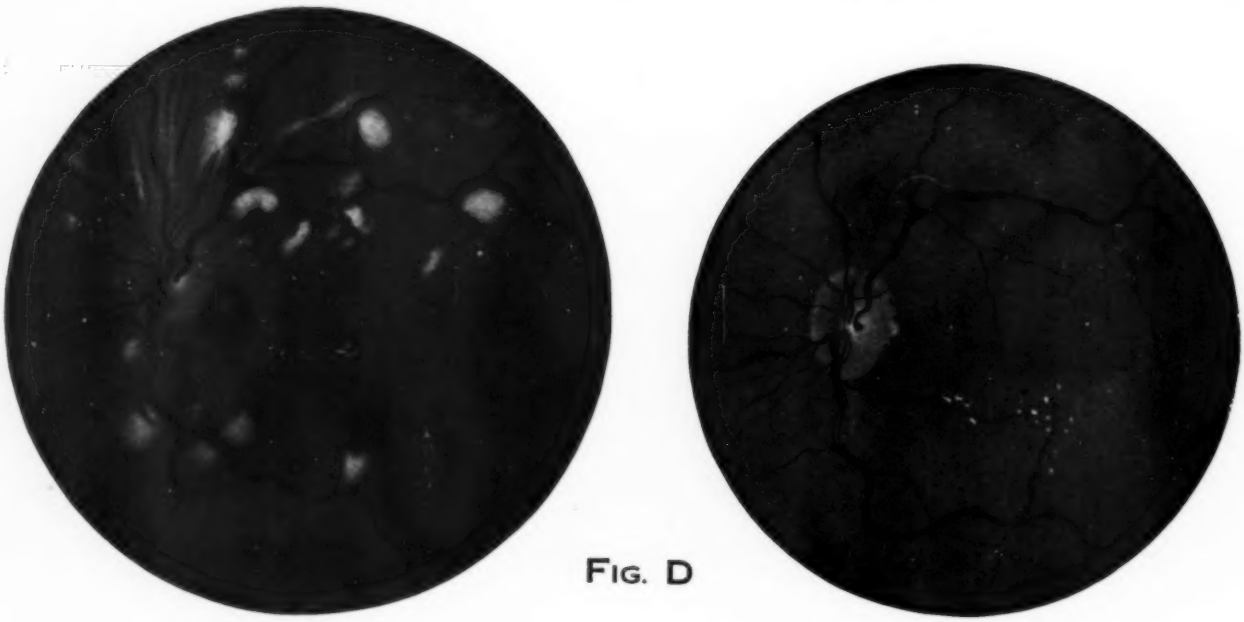

FIG. D

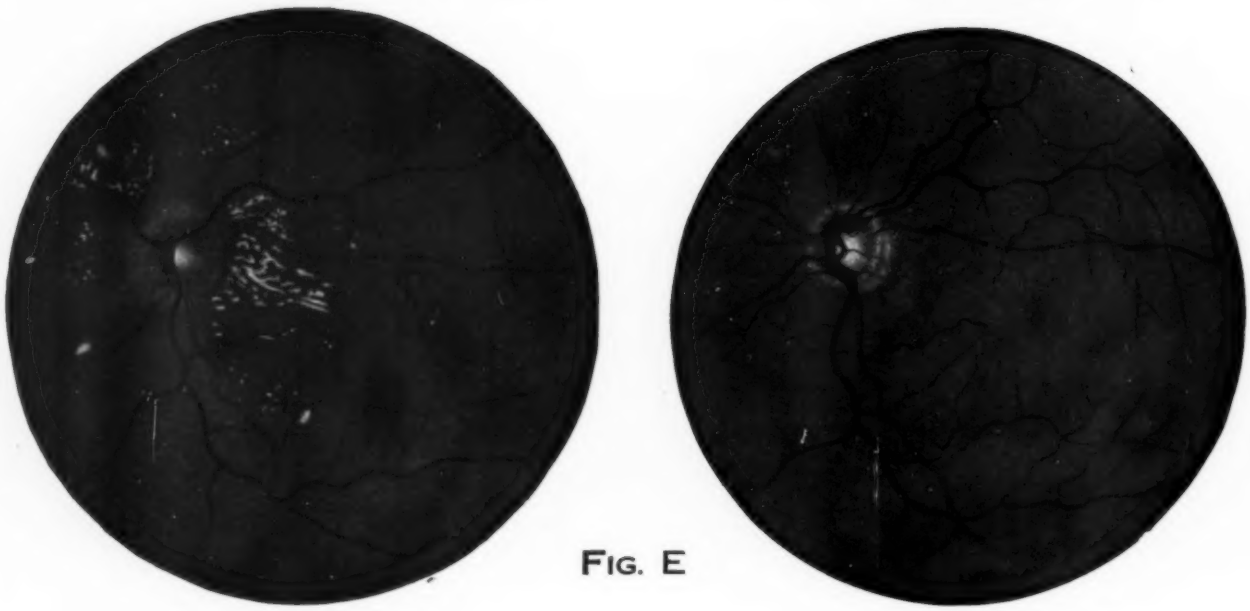

FIG. E

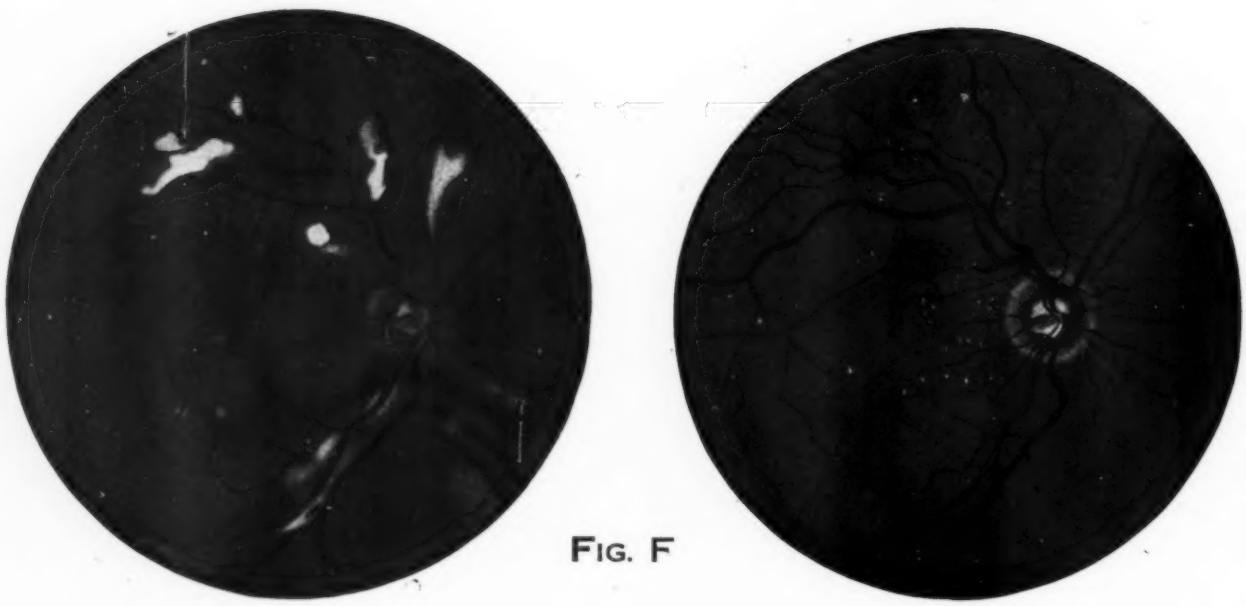

FIG. F

cardiac output remains within normal limits and the rise in blood pressure is accurately adjusted to the increased peripheral resistance so that the blood flow through most parts of the body is normal. What determines the level of the blood pressure? Is it a reflex from the periphery, initiated perhaps by anoxia; or is it the direct result of the damming back of the blood by the hypertonic arterioles?

If no secondary effects or complications occurred, and if the peripheral resistance did not continue steadily to rise, the balance achieved should permit the patient to continue to lead a normal existence with no symptoms referable to his raised blood pressure—a state of affairs often found in moderate degrees of both essential and renal hypertension. However, serious secondary changes do occur and in many cases peripheral resistance does steadily increase.

Hypertrophy of the heart often proves unable to keep pace with the increasing peripheral resistance, so that left ventricular failure and eventually congestive cardiac failure result. As the left ventricle hypertrophies, the increasing demands of the cardiac muscle may outrun the available blood supply—a sequence of events that must occur more readily if the coronary arteries are themselves diseased. Cardiac failure and cardiac ischaemia are common complications of a persistently raised peripheral resistance, and account for the majority of deaths from hypertension. Any lowering of the resistance must lessen the load on the heart, and this is one of the important ways in which treatment may benefit the hypertensive patient.

How far increased blood pressure is itself responsible for structural changes in the larger arteries remains uncertain. Arteriosclerosis can certainly occur in the absence of hypertension, though medial fibrosis and atheromatous changes have long been considered to be especially common in patients with raised blood pressure. Many patients with hypertension die as a result of cerebral catastrophe or coronary thrombosis. One of the difficulties in assessing the results of treatment in hypertension is this high incidence of cerebral and coronary vascular disease and the uncertainty about the exact relationship of the raised pressure to these conditions. Even if not causally related, a lowering of peripheral resistance and a fall in blood pressure might be expected to reduce the incidence of these complications.

The increased tone in the arterioles is, on the other hand, almost certainly associated with, and is probably directly responsible for, the widespread secondary changes, medial hypertrophy, and intimal thickening in the arterioles themselves. These are the characteristic changes of the benign phase of hypertension. When arteriolar tone is very markedly raised and the diastolic pressure very high, a more serious form of arteriolar damage is found. Acute "inflammatory" changes occur in and around the vessel wall—the so-called arteriolar necrosis, the widespread vascular changes characteristic of the malignant phase of hypertension. Arterioles throughout the body may be affected, but the renal arterioles are usually severely attacked and the superadded renal ischaemia may further accentuate the already raised blood pressure, while the renal damage leads to rapidly progressive renal failure.

The Malignant Phase

The persistently raised diastolic pressure is probably directly responsible for these arteriolar changes. In the early stage of hypertension, whether renal or essential, arteriolar tone is labile, varying from minute to minute, with resultant rapid changes in blood pressure. This lability is one of the most characteristic features of raised blood pressure in man, especially in the benign phase when, although casual readings of the diastolic pressure may be high, considerable falls occur on rest or sedation. This lability, though still present, is diminished in the malignant phase, the diastolic pressure being sustained at a high level even at rest.

We owe the clear recognition of the two phases of hypertension to Volhard and Fahr (1914), and in their original work they emphasized the significance of the severe retinal changes found in the malignant phase. Wagener and Keith (Wagener and Keith, 1924; Wagener, 1927; Keith *et al.*, 1928) further clarified the clinical syndrome and demonstrated the desperate prognosis of the malignant phase. They showed that, in its diagnosis, papilloedema was as significant to the clinician as was arteriolar necrosis to the pathologist. Malignant hypertension was for some time regarded as a separate disease entity, but Derow and Altschule (1935, 1941) showed clearly that this was not the case, but that it was a severe phase in the course of hypertensive vascular disease, a phase which might occur whatever the cause of hypertension; and Pickering (1942, 1952) has suggested that it is the severity of the process that leads to the malignant phase.

There has been much discussion about the transition from the benign to the malignant phase. The clinician can diagnose the latter with certainty only when papilloedema is present, though it can be suspected, especially in the younger age group, when the hypertension is rapidly progressive, when the diastolic pressure rises from month to month, when lability is diminished, and when fluffy exudates and haemorrhages appear in the optic fundi. The change to the accelerated or malignant phase may be heralded by the occurrence of frank or microscopical haematuria or by evidence of renal failure. It is in such patients that prompt treatment by causing even a slight lowering of the blood pressure or by restoring a greater degree of lability may prevent the relentless progress of the disease.

While in most patients hypertension remains in the benign phase for years and never reaches a severity sufficient to precipitate arteriolar necrosis, this change may on occasion occur after a long period of mild hypertension. In other patients the hypertensive vascular disease pursues a rapid course from the start and the patient may present with gross retinal changes or even succumb to renal failure before marked hypertrophy of the left ventricle has occurred. The change from the benign to the malignant phase may be insidious, but not infrequently it is dramatic, being associated with severe cerebral manifestations, the headaches, convulsions, and even coma of hypertensive encephalopathy.

Fig. 3 illustrates diagrammatically the present view of the relation between the benign and malignant phases. The

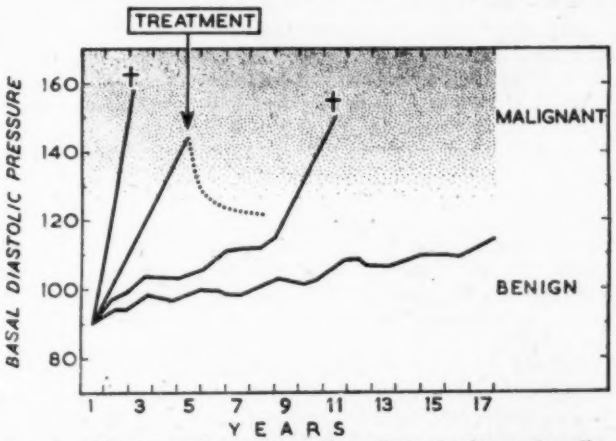

FIG. 3.—Diagrammatic representation of the benign and malignant phases of hypertension.

distinction has been stressed because, when assessing the results of treatment in severe hypertension, the two phases must be clearly separated. The prognosis of the two is different, and so are the possible results of treatment.

The Prognosis of Hypertension

It was only when potentially effective but also dangerous forms of treatment for hypertension became available that the importance of assessing prognosis was generally recognized.

In 1938 Keith *et al.* published their well-known observations on the prognosis in essential hypertension and showed how serious was the occurrence of haemorrhages and exudates in the fundi and how especially ominous was the appearance of papilloedema.

One of the most careful long-term investigations of hypertensive patients is probably that of Bechgaard (1946). He followed some 1,000 patients over a period of 4 to 11 years. Of these 1,000, only 28 were in the malignant phase. Over the period of the survey, 71% of all patients survived: 41% of the 325 men and 22% of the 713 women were known to be dead. Of all the deaths, 45% were due to cardiac disease, 16% to cerebral, and 10% to renal causes. Comparing the mortality in this group with the expected mortality in the population as a whole, Bechgaard found that in male hypertensives the mortality was almost three times as great as in the non-hypertensive population. Benign hypertension is, in fact, not so benign.

Another careful study is that of Palmer and his colleagues (Palmer *et al.*, 1948; Palmer and Muench, 1953), who have reported on some 450 patients followed up over a period of 12 years. Their findings are similar to those of Bechgaard.

Different authors have used different systems of classification. Keith and Wagener originally classified by eye changes alone; Bechgaard and Hammarström (1950), and Palmer and his colleagues, combined cardiac, renal, and retinal findings; while Smithwick (1951) introduced a point system which took many factors into account. In assessing prognosis, in determining the value of therapy, and especially in comparing different series of cases, there is need for a generally accepted method of classification, and an international convention along the lines of the joint report of the British Cardiac Society and the American Heart Association on the method of measuring blood pressure would be of great value.

It is clear that the prognosis in hypertensive vascular disease must depend on many things, such as, for example, the actual severity of the hypertension and its lability, the retinal findings, the secondary cardiac and vascular changes, and renal function. Age of onset is important, as is the age at which symptoms lead the patient to seek advice. Essential hypertension in the female carries with it a far better prognosis than in the male—an observation that has been repeatedly made but never explained.

The difficulties of determining the prognosis of the individual case make it extremely hard to assess the effects of treatment, either in the individual or in small series of cases. Temporary falls in blood pressure are common once the patient has faith in his doctor or in a new drug, and a diminution of tension, both vascular and mental, often follows reassurance, renewed interest, rest, or the use of a new remedy. Conversely, many factors, such as the arrival of the doctor, a visit to hospital, a chance remark, may cause a transient rise in pressure. Many of the symptoms in the benign phase of hypertension are due to accompanying anxiety, which may be allayed, with dramatic relief, by many non-specific measures. The patient's mental state certainly plays a large part in determining the immediate height of his blood pressure.

The marked lability of hypertension, especially in the benign phase, makes it difficult, therefore, to decide on a valid measurement of blood pressure, and it is unwise to assess the status of the patient by blood-pressure readings alone. Basal rather than casual readings and the use of barbiturate sedation tests make the measurements more valuable. In judging the effects of therapy one can measure cardiac size and function, one can assess exercise tolerance and seek for evidence of coronary or renal disease, one can look at the retinae and record the patient's subjective symptoms. It is, however, customary to measure the blood pressure, and we should recognize that a casual reading in the out-patient department or surgery gives little information of value, and often upsets the patients and misleads the doctor.

It is only possible, it seems, to gauge the effect of a new treatment in the benign phase by the observation of a large number of cases over a long period. This entails further difficulties. Patients and doctors soon tire of one form of treatment, and at present new lines of treatment, new hypotensive remedies, and modifications of old are appearing at frequent intervals. It is extremely difficult to maintain an adequate group of patients with benign hypertension under proper control on one treatment for sufficient length of time to provide certain, acceptable evidence of beneficial effect. Short-term improvement and the relief of symptoms, though of immediate benefit to the patient, are not evidence of improved long-term prognosis.

The difficulties are all far less when assessing the results of treatment in the malignant phase of hypertension. There is no need here to depend upon actual blood pressure levels. Two clear-cut observations can be made: the survival time after beginning treatment and the reversal of changes in the optic disks. One of the striking advances in our understanding of hypertension during the past few years has been the recognition that the malignant phase is reversible, so that, even when arteriolar necrosis has developed, if the blood pressure can be lowered the retinal changes will improve and life will be prolonged (Pickering, Wright, and Heptinstall, 1952).

Marked and often dramatic improvement has not only followed the removal of a diseased kidney or a phaeochromocytoma, but it has frequently been observed with many therapeutic measures that lower the pressure without necessarily restoring it to normal. Since it is with this aspect of the symptomatic treatment of hypertension that I am particularly concerned, it is necessary to inquire what facts exist concerning the prognosis of the untreated case of malignant hypertension—standards against which the results of modern therapy can be compared.

Keith *et al.* (1928) found that the average survival time of patients, once diagnosed as being in the malignant phase of hypertension, was eight months, and only 5 of their 81 patients lived two years or more. In the series of cases reported by Ellis in 1938, the average duration from first symptoms to death was only one year. In only 5 out of 40 cases did the total duration exceed two years.

Early in 1953 Schottstaedt and Sokolow published the results of a study of the natural history of the malignant phase of hypertension, reviewing a series of 104 patients. In the 86 who had died the average survival from the date of recognition of papilloedema was 8.4 months. The range was from one day to seven years, only six patients living more than two years. Almost half died within three months of the first diagnosis of papilloedema. The importance of impaired renal function in the prognosis of this phase was demonstrated by Schottstaedt and Sokolow. Of their 104 patients, 37 when first seen had satisfactory renal function in the presence of papilloedema. In these 37, the average survival time, untreated, was 16 months, as opposed to the 8 months in the whole series.

Papilloedema does occasionally revert spontaneously. This reversion is commonest in the severe hypertensive complications of pregnancy, in which both the hypertension and the retinitis are reversible. It is probably rarest in true essential hypertension and in the hypertension of progressive bilateral renal disease. Keith and Wagener (1951), with their very large experience, have observed spontaneous reversion in only 15 cases, while Schottstaedt and Sokolow reported its occurrence in only 3 out of 88 patients who received no specific treatment.

Prolongation of life and reversal of severe retinal changes are therefore good guides to the efficacy of treatment in the malignant phase of hypertension. Only long observation of a large number of patients can prove its efficacy in the benign phase. My second lecture will be devoted to an attempt to assess the value of and the indications for the various methods of symptomatic treatment now available.

LECTURE II

SYMPTOMATIC TREATMENT

In my first lecture I reviewed those rare but important forms of hypertension which can be cured by removal of the underlying cause, and then went on to discuss the far more urgent problem of the prolongation of life and relief of symptoms in those patients with hypertension for which no such cure exists. In the second lecture I will consider four main lines of symptomatic treatment: sympathectomy, hypotensive drugs, low-sodium diets, and adrenalectomy. There is at the present time much anxiety among both consultants and practitioners, a feeling that they should perhaps be more active in the treatment of their many patients with raised blood pressure. I am afraid that my conclusions will be that all these four methods are, so far as we know, best reserved for the severer grades of raised blood pressure, and that we have no new treatment to offer to patients with mild benign hypertension.

Sympathectomy for Hypertension

Since 1925, when Rowntree and Adson reported a case of malignant hypertension treated and improved by bilateral lumbar sympathectomy, operations on the sympathetic nervous system of ever-increasing extent have been widely employed in the treatment of hypertension. The common aim in all these operations has been the production of local sympathetic paralysis with consequent decrease in peripheral resistance and lowering of the blood pressure. These operations occasionally produce striking improvement even in the malignant phase of hypertension, and they were enthusiastically welcomed. Their popularity has, however, recently been on the wane, and thoraco-lumbar sympathectomy is now much less often performed than it was five years ago. It is of interest to inquire into the causes of this fall from popularity.

Convincing evidence of benefit is seen in the results of treatment of patients in the malignant phase of hypertension. As early as 1941, Woods and Peet recorded a five-year survival rate of 33% in patients with malignant hypertension, and in a later review Peet and Isberg (1946) reported the survival, some 5 to 11 years after operation, of 21 out of 112 patients in that phase—a survival rate of 19%. In all the survivors examined, papilloedema had cleared. Other series of cases, both in America (Fishberg, 1949; Smithwick, 1951; Smithwick and Thompson, 1953) and in this country (Morrissey *et al.*, 1953; d'Abreu, 1953) bear evidence to the prolongation of life and to retinal improvement following operation on patients in the malignant phase.

Bechgaard and Hammarström (1950) compared their operated patients with a selected control group, and were able to demonstrate that survival was undoubtedly greater in the operated group, which included patients with frank papilloedema and those with retinal exudates but no papilloedema.

Of a small series of patients on whom operation was performed at University College Hospital, 11 had papilloedema. In four this cleared post-operatively (in one only with the aid of the rice diet), and three of these four were alive five to six years after operation.

Benefit has been seen, in the malignant phase, in renal as well as in essential hypertension.

Case 4.—Fig. B shows the fundus of a man aged 28 who developed intense headaches and gross retinal changes eight years after the onset of nephritis. His renal function was then satisfactory, and operation was performed in the hope of saving his sight. His vision improved and he spent a year at work as a tool setter. Despite his improved eyesight, his blood pressure rose again and he died from renal failure some 15 months after his operation.

Case 5.—An even more striking case is that of a schoolteacher who was 39 when she was first admitted under Dr. Kenneth Harris in 1944 with nephritis. She had been known to have albuminuria for four years, and on admission had marked oedema, albuminuria, and hypoproteinaemia. Her blood pressure was then 150/100 mm. Hg. The oedema gradually cleared over the next few years. In 1948 she was admitted on account of intense headaches. Her blood pressure was 200/135, her retinal arteries were narrowed, there were fine exudates, and bilateral papilloedema developed. There was then no oedema, her blood urea was normal, and she had only slight albuminuria. She was operated on by Professor R. S. Pilcher in 1948. Renal biopsy showed changes suggestive of advancing nephritis. Her papilloedema cleared, and when last seen, five years after operation, she was actively engaged in teaching and had even spent an "exchange year" teaching in the United States. She had no headaches, and her fundi showed only arterial changes. Her blood pressure was 195/120 mm. Hg. Albuminuria had remained minimal and her blood urea was normal.

Unfortunately, many patients in the malignant phase of hypertension cannot be treated surgically, for severe cardiac damage and renal failure are often present. Those cases that are suitable for sympathectomy are also suitable for the less drastic forms of treatment available to-day. Operation is therefore now rarely performed in the malignant phase.

It is more difficult to decide whether widespread sympathetic resection is of benefit to patients with benign hypertension. Smithwick claims to have shown statistically that operation does benefit all groups of hypertension. In his earlier papers (Smithwick, 1948) he compared his results with Keith and Wagener's figures for untreated cases; more recently (Smithwick, 1951; Smithwick and Thompson, 1953) he has used as a control group patients who declined operation. There has been considerable criticism of his figures, mainly on the grounds of inadequate pre-operative assessment of the patient's status. In a critical survey of patients operated on in the public wards of the Massachusetts General Hospital, Evelyn *et al.* (1949) found evidence of long-term benefit in only 21% of the patients, in 52% blood pressure was not significantly lower than before operation, while 27% of the patients were dead.

That operation is of benefit in the benign phase is suggested by a number of reports. Paul White *et al.* (1950) followed two series of private hypertensive patients with cardiovascular complications and found that of 50 patients treated conservatively 24 had died in the three years, while only 8 of 50 who had been operated on were dead. There have also been impressive reports of women with hypertension who have had successful pregnancies following sympathectomy (Newell and Smithwick, 1947; Peet and Isberg, 1949; d'Abreu, 1953). An improved blood flow to the uterus and placenta may of course have been in part responsible.

Bechgaard and Hammarström, who have produced one of the best reports on the surgical treatment of hypertension, are cautious and have not yet published the full account of the follow-up of the milder groups of their patients. Yet in 1950, when they reported the improved survival of the malignant cases, they had already observed in their milder cases that the mortality in operated males was half that in the controls, and the results were even more striking in women.

No satisfactory pre-operative test has been found that will show whether a patient's blood pressure will or will not fall after operation. In the benign phase, temporary falls of blood pressure are common after non-specific operations, and even when the blood pressure does fall after sympathectomy it often slowly returns to its previous level. The relief of headaches following operation is often dramatic, but provides no objective evidence of improved long-term prognosis. If, as Evelyn has shown, only 20% of patients are found to have benefited 5 to 10 years after operation, it is clearly not justifiable to recommend this severe form of treatment to the uncomplicated case. Fishberg (1948) stated that operation was indicated in less than 4% of all the patients he saw with essential hypertension.

The survival of the uncomplicated case is good with no treatment, and Platt and Stanbury (1950) summed up the situation well when they stated that patients with hypertension could be divided into two main groups : those who were too fit for operation and those who were too ill or too old. A small intermediate group might benefit.

There seems to be no doubt that six to eight years ago operation was too frequent. The occasional remarkable relief of the malignant case and the improvement of headaches and immediate post-operative fall in blood pressure in the benign phase encouraged physicians and surgeons to recommend operation rather widely, and it is to a large extent the indiscriminate use of the operation that has led to its disrepute. The pendulum may have swung too far the opposite way, and it is probable that there will be a continued and perhaps increasing demand in the future for operation in selected cases such as the young patient in the malignant phase with good renal and cardiac function or the patient in the benign phase in whom the disease is clearly advancing towards the malignant phase or who is developing early heart failure. If operation is successful in lowering the blood pressure the patient can lead a freer life than can patients maintained on drugs or diet, while, if unsuccessful, drug therapy can still be tried.

Drug Therapy

During the past six years numerous drugs have been introduced as hypotensive agents. Since hypertension is a very common disease and one for which no specific cure is yet available, it is not surprising to find that pharmaceutical firms have hurried into the field as the surgeons had before them. Many of the new drugs have been marketed, made available for general use, and widely applied before adequate knowledge has been acquired about their mode of action, their efficacy, or their dangers. The situation has been further complicated by claims made for synergism or more effective action of combinations of these drugs and by the publication of many papers based on short periods of observation.

The difficulties of assessing the effect of therapy in the benign phase of hypertension have already been stressed. It is even more difficult to compare two or more drugs ; for this cannot be done, as a long-term project, on the individual patient, and the comparison of series of selected patients adequately treated with different drugs requires much time, careful planning, and whole-hearted co-operation by the patients themselves. Few long-term studies of drug therapy are yet available.

My own experience is limited almost entirely to the methonium compounds, and especially to hexamethonium and its homologues. These are undoubtedly the most potent and the most widely used of the drugs now available, and we possess precise knowledge of their mode of action. If I devote most of my remarks on drug therapy to hexamethonium, I do so not only because of my greater experience with it but because I feel that the difficulties encountered in assessing the value of a single hypotensive agent are likely to provide lessons which may be of value in the trial of the new drugs which are certain soon to be introduced.

Hexamethonium

Hexamethonium interferes with the passage of nervous impulses through both sympathetic and parasympathetic ganglia. The removal of sympathetic vasoconstrictor tone leads to widespread vasodilatation. In the supine normal man, hexamethonium, even in large doses, produces little change in blood pressure, suggesting that vasomotor tone plays little if any part in the maintenance of normal blood pressure in that position. When he stands, however, reflex vasoconstriction being abolished, marked hypotension occurs with accompanying tachycardia and often with faintness due to cerebral anoxia. In the hypertensive patient there is a fall of pressure even in the supine position, so that vasomotor tone must play some part in the maintenance of raised blood pressure. In the standing position the blood pressure of the hypertensive falls still further. Since the main object of the treatment, so far as we know, is to lower the blood pressure and to relieve or prevent the secondary effects of hypertension, the postural fall of pressure can be used, and probably plays an important part, in treatment.

One of the factors that complicates treatment is the giddiness or faintness that accompanies too great a postural fall of blood pressure. In this country the dosage is usually so adjusted that the patient has to rest after each injection, being temporarily incapacitated in the upright posture. This is not a sign of toxicity, but of effective action. In New Zealand the dosage used must be less, for rest after each injection is not required (Smirk, 1953b). The best method of using hexamethonium for long-term treatment has yet to be decided.

The next complication is the lack of specificity of blocking action—for parasympathetic ganglia are also affected and the hypotension of sympathetic blockade is often accompanied by paralysis of accommodation, by a dry tongue, and often by diminished intestinal peristalsis. These again are side-effects and not evidence of true toxicity. So far no drug is known which will specifically block the sympathetic pathway. The discovery of such a drug would mark a considerable advance in therapy, though postural hypotension would, of course, still occur.

Hexamethonium and pentamethonium compounds were first administered by parenteral injection, but it was soon shown that, in much larger doses, they were effective by mouth. Oral therapy is more difficult to control and is more apt to be accompanied by severe and even dangerous side-effects. Milne and Oleesky (1951) showed that only a small proportion of an oral dose was absorbed, and this has been confirmed by Harington (1953), in our laboratories at University College Hospital, in an extensive investigation into the absorption and excretion of hexamethonium. He showed that while, after parenteral injection, some 90% of the dose could be found in the urine within a few hours, less than 10% of an oral dose was normally excreted in the urine in 24 hours, most of the remainder being found unabsorbed in the faeces. It is clear that, if gut movements cease, continued absorption of the drug may occur, leading to a vicious circle and possibly to severe paralytic ileus. This has been recorded with oral (Campbell and Robertson, 1950 ; Bourne and Hosford, 1951) but never, so far as I know, with parenteral therapy.

Morrow *et al.* (1953) have recently reported a case of ileus, occurring during oral administration, in which the blood level of hexamethonium, already high, rose further during the next 72 hours, although no more drug had been given. The level fell to normal when bowel activity was restored. Harington showed that absorption from the gut was variable. One normal subject given 1 g. of hexamethonium bromide after his normal breakfast suffered from postural hypotension for only half an hour and excreted only 7% of the dose in his urine during the next 24 hours. Given the identical dose before breakfast, he was prostrate with postural hypotension for twelve hours, and urinary analysis showed that he had absorbed and excreted nearly 400 mg. of the drug (38.7% of the dose) (Fig. 4). It is curious that absorption also varies according to the salt of hexamethonium that is used (Fig. 5).

There are thus good reasons for preferring intramuscular or subcutaneous administration, and these are now the generally recommended routes. Attempts have been made to find a similar compound that might be both effective and safe when given by mouth. One, pentolinium tartrate (" ansolysen ") has been found to be much more active than hexamethonium, so that a smaller dose is required. This drug has been recommended for oral use, but the same dangers exist—poor absorption from the gut (Harington, 1954) and variability of effect in relation to time of administration (Smirk, 1953a).

The next difficulty in applying hexamethonium to the treatment of hypertension is the rapidity of its excretion—

and the consequent short duration of action. Unless renal failure is present, the effect of an intramuscular or subcutaneous injection rarely lasts longer than six hours, so that three injections a day are usually required. In the presence of renal failure, excretion is greatly delayed, action is prolonged, and the effective dose correspondingly reduced (Harington, 1953) (Fig. 6). Most patients soon learn to give themselves injections, but three injections a day are troublesome, especially when each is followed by a period of postural hypotension. Attempts have therefore been made to lengthen the action of the drug by using different vehicles (Smirk, 1952). A solution of hexamethonium in polyvinylpyrrolidone has been recommended. We have not been convinced that such solutions offer any advantage except in the occasional case, and excretion studies (Harington, 1954) have shown that hexamethonium is as rapidly excreted in the urine when injected in this form as when given in aqueous solution.

These, then, are some of the difficulties of applying ganglion-blocking agents to the control of raised blood pressure in man; unavoidable side-effects such as postural hypotension and parasympathetic blockade; short duration of action and diminished excretion in the presence of renal failure; and, on oral administration, irregular absorption. If control of the blood pressure is satisfactory, treatment must usually be continued indefinitely, for, on stopping it, the blood pressure soon reverts to its original level. One of our patients with malignant hypertension has, however, remained well for a year after hexamethonium was stopped. Hexamethonium has now been available for some four years, and several reviews of the results of therapy have been published in this country (Campbell and Robertson, 1950; Locket *et al.*, 1951; Mackey and Shaw, 1951; Campbell *et al.*, 1952; Morrison, 1953), in America (Freis *et al.*, 1952; Moyer *et al.*, 1953; Sokolow and Schottstaedt, 1953), and in New Zealand, where Smirk has done so much to popularize the drug (Smirk and Alstad, 1951; Smirk, 1953b).

We have recently reviewed our own experience (Harington and Rosenheim, 1954). We have not embarked upon a long-term project of determining its value in the benign

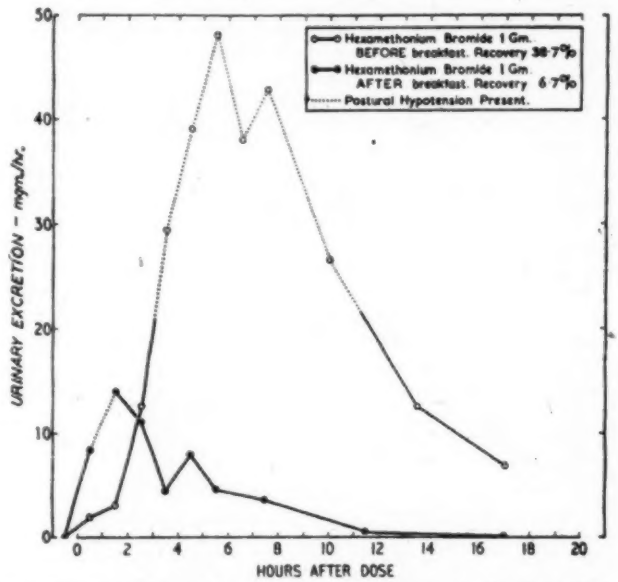
Hexamethonium Bromide 1 Gm. BEFORE breakfast. Recovery 38·7%
Hexamethonium Bromide 1 Gm. AFTER breakfast. Recovery 6·7%
Postural Hypotension Present.
URINARY EXCRETION – mgm./hr.
HOURS AFTER DOSE

FIG. 4.—The effect of hexamethonium before and after breakfast in a normal subject. (Reproduced by permission of the Editor of *Clinical Science* and of Dr. M. Harington.)

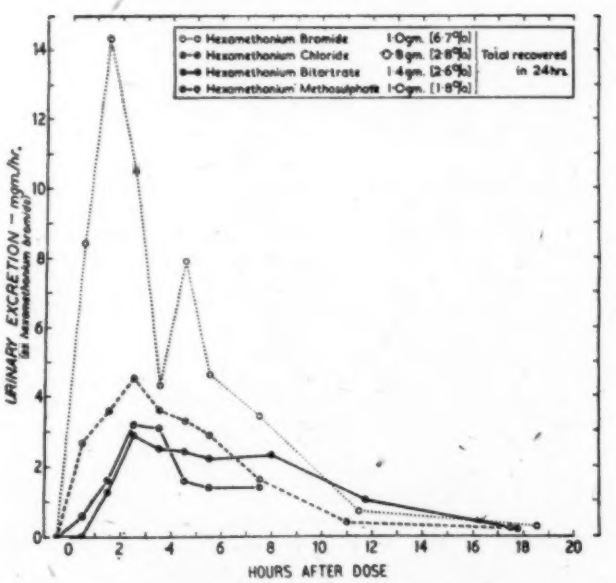
Hexamethonium Bromide 1 Gm. (6·7%)
Hexamethonium Chloride 0·8 gm. (2·8%)
Hexamethonium Bitartrate 1·4 gm. (2·6%)
Hexamethonium Methosulphate 1·0 gm. (1·8%)
Total recovered in 24 hrs.
URINARY EXCRETION – mgm./hr. (as hexamethonium bromide)
HOURS AFTER DOSE

FIG. 5.—Urinary hexamethonium excretion after oral dose of various salts in a normal subject. (Reproduced by permission of the Editor of *Clinical Science* and of Dr. M. Harington.)

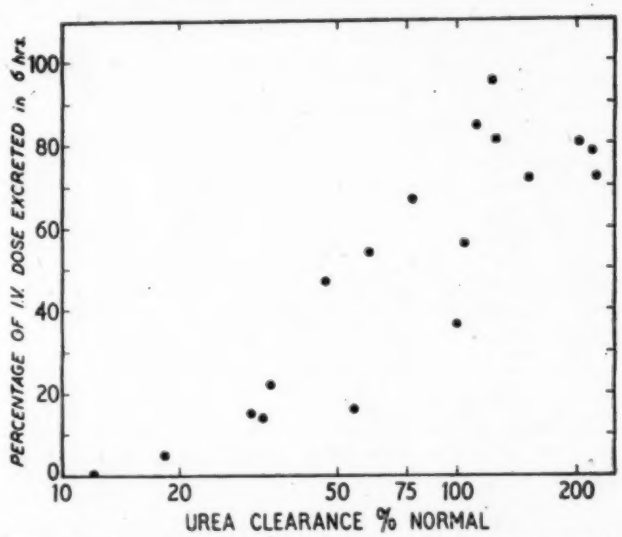

FIG. 6.—Variation of urinary hexamethonium excretion with renal function. (Reproduced by permission of the Editor of *Clinical Science* and of Dr. M. Harington.)

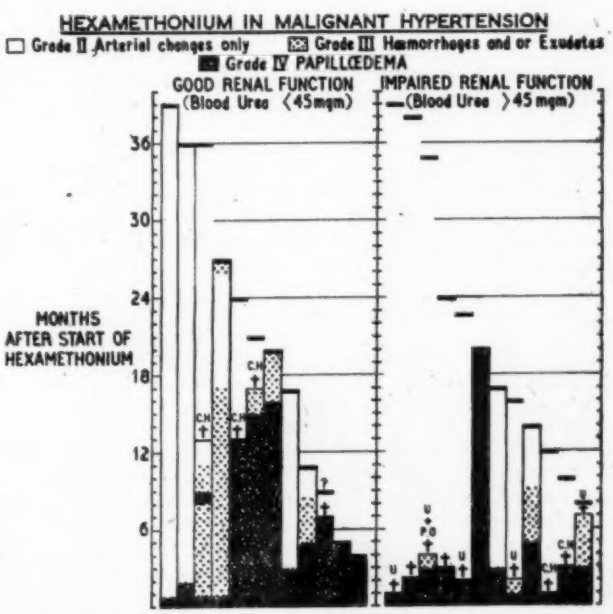

FIG. 7.—The progress of 24 patients with malignant hypertension treated with hexamethonium. For details see text. C.H.= cerebral haemorrhage. U.=Uraemia. P.O.=Pulmonary oedema.

phase. In the malignant phase, both of renal and of essential hypertension, we have seen marked improvement and are convinced of its value. Of the 36 patients in whom we have tried to maintain prolonged control, 24 had papilloedema and a further 8 had exudates and/or haemorrhages in their fundi before treatment.

Fig. 7 shows the progress of the 24 patients in the malignant phase of hypertension. Each column represents a patient, and the height shows the duration of treatment from the day hexamethonium was started. The thick line indicates how long ago treatment was begun, and where the column fails to reach this line the patient has died. Papilloedema is indicated by the black shading, and was present in all the cases; stippling indicates the presence of haemorrhages or exudates, but no papilloedema; and where the column is clear, arterial changes alone are present. In 13 out of the 24 patients the changes in the optic disk have cleared or improved greatly under treatment (Table III). Out of 18 patients who started treatment a full year or more ago, 8 are alive; out of 9 who started two or more years ago 3 are alive, while 2 survive out of 5 who started treatment three years ago (Table IV).

TABLE III.—*The Effect on Papilloedema of Treatment with Hexamethonium in 24 Cases of Malignant Hypertension*

Papilloedema: Disappearance or very marked improvement.
Good renal function in 8 out of 12 patients.
Impaired „ „ 5 „ „ 12 „

TABLE IV.—*The Survival of Patients with Malignant Hypertension Treated with Hexamethonium*

Years	Renal Function				Total	
	Good		Impaired			
	Possible	Actual	Possible	Actual	Possible	Actual
1	8	5	10	3	18	8
1½	7	4	6	1	13	5
2	5	3	4	0	9	3
3	3	2	2	0	5	2

Schottstaedt and Sokolow (1953) reported the average duration of life in the untreated malignant phase, from the date of diagnosis of the retinal change till death, to be 8.4 months. The average duration of treatment in our 24 cases, including those who have died, is now about one year. Schottstaedt and Sokolow drew attention to the serious significance of impaired renal function, and the same observation can be made in our small series. Fig. 7 shows clearly the difference in prognosis in cases with an initial blood urea above or below the arbitrary figure of 45 mg. per 100 ml. In the 12 patients with adequate renal function the average duration of treatment is about 18 months, and 8 are still alive, while in the 12 with an initially raised blood urea it is only six months. Nine of the 13 deaths have occurred among patients with impaired renal function. This does not necessarily imply that treatment is contra-indicated in the presence of renal failure, for in the occasional case remarkable improvement does occur (Harington and Rosenheim, 1954), and considerable symptomatic relief and improvement in vision can be obtained even if life is not prolonged.

Case 6.—Fig. C shows the fundi of a man aged 26 with chronic nephritis and a raised blood urea (96 mg. per 100 ml.). When the first drawing was made, his main complaints were of headache and of severe and increasing impairment of vision. Under treatment his eyesight improved and he became able to read and drive a car, though he died of uraemia and pulmonary oedema four months after starting treatment. In cases like this, hexamethonium can be used if operation and diet are dangerous.

Our figures are similar to those reported by Morrison (1953) and by Sokolow and Schottstaedt (1953), but are too few for definite conclusions to be drawn concerning survival. We feel that, in the absence of renal failure, life can be prolonged, while reversion of papilloedema is frequently observed.

Case 7.—Fig. D shows the fundi of a man aged 52 admitted to hospital in February, 1953, with intense headaches, vomiting, and breathlessness. His fundi then showed severe papilloedema, haemorrhages, and exudates. His renal function was good and he was treated with parenteral hexamethonium. When seen in February, 1954, he felt very well, headaches were few, and he was working full time. His disks were sharply defined and there were no haemorrhages or exudates. His blood urea was normal.

In none of our patients in the malignant phase with normal initial renal function has death from uraemia occurred, three out of the four deaths having been due to cerebral catastrophe. Prolonged therapy has been accompanied by deterioration in renal function in only two of these patients.

Hexamethonium therapy, properly controlled, will thus often relieve the severe manifestations of malignant hypertension and is probably now the treatment of choice. We feel that it should be used in those patients with severe benign hypertension in whom the progress of the disease, the presence of fluffy exudates in the fundi, or the occurrence of haematuria suggests the approach of the malignant phase. It is of value in the treatment of cardiac symptoms, and especially of pulmonary oedema, and occasionally provides dramatic relief in patients with hypertensive encephalopathy. It can be safely used in patients who have had previous cerebral thromboses, though caution is needed in recent cases. Whether it can be safely used after a recent coronary thrombosis is as yet uncertain.

We have no evidence that it will prolong life in patients with moderate or mild degrees of benign hypertension. Smirk (1953b) has recently published an account of his present views on the use of hexamethonium and allied drugs, and he is using them widely in the benign phase of the disease. He states that any hypertensive patient in whom the basal blood pressure does not fall below 175/100, even if there are no symptoms, should probably be treated, and that patients with a casual pressure frequently over 250/120 also require treatment. He has recorded marked relief in cardiac symptoms and improvement in electrocardiograms, but states that longer observation is required before significant alteration in mortality figures can be obtained.

Hypertension is a serious disease, and it is extremely important to determine as soon as possible whether long-term therapy of the benign phase will result in a fall in the number of deaths from cerebral and coronary disease, and if the onset of cardiac failure can be averted. Long-term controlled studies are required. This presents a difficult problem that calls for combined effort—perhaps directed by the new Clinical Research Board. If such studies were to indicate that marked benefit resulted from treatment in the early and benign phases of hypertension there would have to be a major revolution in our attitude to the disease, and the medical profession would be faced with a therapeutic problem immeasurably greater than that which followed the introduction of insulin.

The general opinion of those who have experience of other hypotensive drugs is that hexamethonium is the most potent and effective agent. The veratrum derivatives, especially "veriloid" and "protoveratrine" have been extensively used, and improvement in the malignant phase, with recession of papilloedema, has been recorded (Currens *et al.*, 1953). Hydralazine ("apresoline") has also been widely acclaimed, but it is now mainly recommended for use in combination with other drugs (Harris and Turner, 1954), its tendency to increase pulse pressure and cardiac output and to produce throbbing headaches being then controlled. Schroeder (1953) has made extensive claims for the combined use of oral hexamethonium and hydralazine, and has recently published impressive results. His work awaits confirmation. The most recent hypotensive drugs to be introduced are preparations of *Rauwolfia serpentina*. I have little personal experience of these, but perusal of the literature suggests that their action is more sedative than hypotensive, though combination with other drugs may produce enhanced effects.

Low-salt Diets

The history of the use of low-sodium diets in the treatment of hypertension illustrates well the swing of therapeutic enthusiasm. In 1904 Ambard and Beaujard showed that severe salt restriction led to a fall in blood pressure in hypertensive patients. It is difficult now to assess how far diet was then accepted as a method of treatment, but it is interesting to note that George Oliver (1908) stated that "a saltless diet soon becomes so distasteful to the majority of patients that it is difficult for them to continue it for more than a week or two at a time"—an observation that has of course been often repeated since. In 1920 Allen reintroduced low-salt therapy, and in 1922 Allen and Sherrill extolled its use in both hypertension and cardiac failure. Low-salt diets, however, were no better tolerated in the 1920's than earlier in the century or than they are at the present time. It has been suggested that their second fall from favour coincided with the introduction of the mercurial diuretics.

In 1944 Kempner introduced his rice diet for the treatment of hypertension, and, although this was started with the object of improving the supposedly abnormal metabolism of damaged renal cells, there can now be no doubt that the effect of the diet is due to its extremely low sodium content (6 mEq/day). Kempner (1948) produced clear evidence of the efficacy of his diet in severe hypertension. In 125 of 500 patients the blood pressure returned to normal or almost normal levels and there was marked improvement in many others. Twenty-three of his patients had papilloedema and in 17 this disappeared completely, and in only one did it remain unchanged. Haemorrhages and exudates also improved, and he was able to demonstrate significant improvement in cardiac size and in electrocardiographs. While his observations have been challenged by some, a short-term trial in this country (Medical Research Council, 1950) confirmed his main findings, and other workers have reported similar benefits not only from the rice diet but from other low-sodium diets. Rigid salt restriction is dangerous in patients with renal failure, and the diet cannot be used in many patients in the malignant phase. The improvement in the following case appears to be at least in part due to the rice diet.

Case 8.—Fig. E shows the drawings of the fundus of a man who was aged 52 when admitted to hospital with a transient left hemiplegia. He was found to be in the malignant phase of hypertension, and in December, 1948, a bilateral transthoracic thoraco-lumbar sympathectomy was performed. His blood pressure remained unaltered and his papilloedema persisted. In July, 1949, he was readmitted with a right hemiplegia and was treated with the rice diet. His blood pressure before treatment started was 230/140; after three weeks on the diet it had fallen to 155/100. Owing to severe cramps the full diet then had to be stopped, and he left hospital on a low-sodium diet, his blood pressure being 200/120. His fundi improved steadily. He is still on a restricted sodium diet, his blood pressure remains high, and he has severe angina, but his fundi show no papilloedema and his blood urea is only 30 mg. per 100 ml. It would appear that the low-salt diet, following sympathectomy, brought this patient out of the malignant and back into a more benign phase of hypertension.

It is almost impossible, in this country at least, to persuade patients to adhere to a rigid low-sodium regime, and a diet that is not nearly salt-free has little, if any, effect on hypertension. There is a tendency now to use less rigid restriction; but, while this may benefit cardiac failure and oedema, it is of little value in hypertension. There is some evidence, however, that low-salt diets may increase the efficacy of drug therapy (Smirk and Alstad, 1951), and more detailed observation, especially on the degree of restriction required, is needed on this point. More recently, attempts have been made to control hypertension on a less rigid sodium restriction, using cation exchange resins to extract sodium from the body (Gill and Duncan, 1952; Duncan and Gill, 1953).

Extreme sodium restriction, beyond that necessary to relieve oedema, has a marked effect on hypertension, and renewed interest has been aroused in the relationship between sodium and blood pressure. It would appear from the very careful studies at the Bellevue Hospital in New York (Watkin *et al.*, 1950) that the effect of a very low sodium intake on hypertension is not directly related to any change in plasma volume, interstitial fluid, or total body water, nor could the fall in blood pressure be correlated with any observed change in serum sodium levels. Similar observations have been reported by others (Currens *et al.*, 1949; Murphy, 1950). Many workers (Weston *et al.*, 1950; Chasis *et al.*, 1950) have shown that there is a considerable fall in glomerular filtration rate on severe sodium restriction—a fall that is rapidly reversed by the addition of salt to the diet. Yet this change cannot be associated with or cause a fall in blood pressure, for in many of the patients observed the diet was clinically ineffective.

It is probable that the severe restriction of sodium leads, in some way, to altered activity of the adrenal cortical hormones and that some form of synergism between sodium and the adrenal cortex is necessary for the maintenance or production of a raised blood pressure. The relationship between the adrenal cortex and hypertension requires no emphasis. Hypertension cannot be produced experimentally in adrenalectomized animals, and adrenalectomy leads to a marked fall of blood pressure in animals with experimental hypertension. This relationship between the adrenals and experimental hypertension was fully reviewed by Clifford Wilson (1953). Cushing's syndrome, or adrenal cortical hyperplasia, is often accompanied by hypertension, which may pass into the malignant phase. Further, the administration of adrenocorticotrophic hormone in man may produce a rise in blood pressure. Merrill (1952) has marshalled the evidence for the participation of the adrenal cortex in the mechanism of hypertension, though he emphasized that this might be only one of a number of factors.

Adrenalectomy

The most recent surgical attack on severe hypertension has been that of bilateral adrenalectomy. As long ago as 1934, DeCourcy reported a series of six patients on whom subtotal bilateral adrenalectomy had been performed for essential hypertension—the rationale being the belief that the adrenal medulla was concerned in the production of hypertension. A further—favourable—report on 30 cases was published in 1950. Apart from medullary tumours, attention to-day is centred mainly on the adrenal cortex and on the significance of the cortical rather than the medullary hormones.

It is only during the past few years that cortisone has become available for substitution therapy—either in Addison's disease or following bilateral adrenalectomy in Cushing's syndrome, hypertension, or malignant disease. Prior to this, treatment depended upon the use of adrenal cortical extracts and the synthetic deoxycortone. Several groups of workers have recently been investigating the effects of bilateral adrenalectomy in severe hypertension in man, being led to this therapeutic experiment by various lines of reasoning. Pickering used subtotal adrenalectomy as an aid to other surgical measures in hypertension in a series of cases in 1946 (Pickering *et al.*, 1952; Pickering and Heptinstall, 1953), the operation being suggested by Goldblatt's abolition by adrenalectomy of experimental hypertension in dogs. Green *et al.* (1950) reported a case of malignant hypertension in a diabetic, which was improved by bilateral adrenalectomy and maintained on adrenal cortical extract and deoxycortone. They believed that there was sufficient evidence that abnormal adrenal cortical function played a part in sustained human hypertension to justify operation.

More recently two large centres in the United States have been investigating this line of attack. Thorn, in Boston, was impressed by the observation of two patients with hypertension who developed Addison's disease and became normotensive. One of them, treated with deoxycortone, became hypertensive again. Thorn and his colleagues (Thorn

et al., 1951, 1952; Harrison *et al.*, 1952) have operated on a series of patients, carrying out bilateral total adrenalectomy, with careful pre-operative preparation and post-operative cortisone therapy. The Philadelphia School embarked upon their study in order to determine whether or not adrenalectomy deserved a place in the treatment of clinical hypertension, and have published a series of progress reports (Wolferth *et al.*, 1951, 1953; Jeffers *et al.*, 1953; Lukens, 1953). They have, in most cases, done only a subtotal adrenalectomy, combined in many with a bilateral thoraco-lumbar sympathectomy. Of the 99 cases recently reported (Jeffers *et al.*, 1953) only two had had a total adrenalectomy without sympathectomy. The combined operation makes the assessment of the results of adrenalectomy itself difficult.

The results so far reported are more interesting than impressive. It is clear that, at this stage, the operation can be performed only on really severe cases of hypertension, for in the post-operative state the patient is completely dependent upon regular cortisone therapy, the omission of which can precipitate an Addisonian crisis within 48 hours. Since even slight impairment of renal function must be considered a contraindication to operation, suitable cases are rare. The operation is still experimental, but it does offer an opportunity for studying the effect of replacement therapy, of cortisone and other adrenal cortical hormones, of deoxycortone, and of sodium on the blood pressure. In the hope that careful studies of the fluid spaces in the body and of electrolyte balances might throw some light on the mechanism of hypertension, we have recently embarked upon a trial of bilateral total adrenalectomy in the occasional case. Mr. Bernard Harries has so far performed the operation for us on two severely hypertensive patients and on one case of Cushing's syndrome with hypertension. The maintenance of totally adrenalectomized hypertensive patients on oral cortisone requires very careful supervision and appears to be definitely more difficult than the management of patients with Addison's disease. We have, of course, far too little experience for any conclusions to be drawn, but I should like to contrast what has occurred in our two patients.

Case 9.—A man aged 47 was admitted to hospital in the malignant phase of hypertension, and, early in May, 1953, both adrenals were removed under cover of cortisone and hydrocortisone. He stood the operation well. During the immediate post-operative period, although on cortisone, he lost a large amount of sodium and went into a mild Addisonian crisis. On the fourteenth day his blood pressure had fallen to 100/70 and he had lost about 200 mEq of sodium. At this stage his blood urea had risen, and he was clearly suffering from adrenal cortical insufficiency. An increase in his cortisone led to sodium retention and his blood pressure rose. He was discharged from hospital at the end of May, on 50 mg. of oral cortisone, 50 mg. of methyltestosterone, and 7.5 g. of extra salt daily. On this regime, or modifications of it, he remained well and went back to work, having lost his severe and crippling headaches. In July he became anaemic following melaena probably due to a pre-existing duodenal ulcer. He made a good recovery from this as an outpatient, but in October he was admitted to hospital, having again had severe melaena. His blood pressure on admission was 180/120, but it soon fell to 100/70. Treated with blood transfusion, he improved, but next day he had a further severe haemorrhage and his blood pressure fell to 75/60. It was decided that operation was essential, and during the next four hours he was given further blood and 350 mg. cortisone in divided doses. When he was taken to the theatre his blood pressure was 102/84 and it was thought that noradrenaline and hydrocortisone would be required to maintain his pressure during operation. However, as the partial gastrectomy proceeded, and with only a blood transfusion, his pressure rose steadily, and at the end it reached 290/160; by this time he began to develop pulmonary oedema and had to be given intravenous hexamethonium. He is now relatively fit, and back at work, on 25 mg. of oral cortisone daily and a varying dose of methyltestosterone. Fig. F shows drawings of his fundi before and five months after his adrenalectomy.

It is tempting to suggest that, in this patient who improved so markedly following adrenalectomy, a massive dose of cortisone, perhaps associated with the blood transfusion, reproduced the original malignant level of blood pressure. Our other patient behaved differently.

Case 10.—A man aged 42 had long-standing very severe hypertension, without papilloedema. He had been treated over many years with low-salt diets and hexamethonium. He had had multiple cerebral thrombosis, and had developed some degree of bulbar palsy and occasional epileptiform attacks. His blood pressure had become resistant to hexamethonium even in enormous dosage, and bilateral adrenalectomy was performed in a final effort to control his blood pressure. He stood the operation well, but seven days after operation he had an epileptiform attack in which his blood pressure rose to 300/260. We found it impossible to assess his biochemical status from his blood-pressure level, and even when chemically in a state of advanced Addisonian crisis he was able to maintain a diastolic pressure of 110–120 mm. Hg and on one occasion even as high as 135 mm. Hg.

It is evident that the response of these two patients to adrenalectomy was very different, and that, while the first was apparently unable to maintain a high blood pressure in the absence of adrenal cortical hormones, these hormones were not an essential factor in the persistent hypertension of the second.

Comment

Adrenalectomy has added one more to the growing list of measures which are known to lead to the reversal of the malignant phase of hypertension. These now include the removal of a phaeochromocytoma, nephrectomy for unilateral renal disease, major operation on the sympathetic nervous system, the use of hypotensive drugs, and rigid restriction of the sodium intake. It is clear that the malignant phase of hypertension is indeed dependent upon the severity of the hypertensive vascular disease, that it can occur in many different forms of hypertension, and that lowering the blood pressure is a non-specific method of relieving it. The underlying mechanism of the benign phase remains unknown—noradrenaline, sympathetic vasomotor tone, sodium, and the adrenal cortical hormones all appear to play some part.

There is, thus, much that we can now do to help the patient with severe hypertension. The presence of the changes of the malignant phase, or of signs and symptoms heralding its approach, calls for urgent treatment. Evidence that the heart may no longer be able to bear the strain of severe hypertension must also be regarded as an indication for intervention.

In the early and often asymptomatic stages of benign hypertension, however, drastic treatment is not only unwarranted but, since it makes the patient more conscious of his disease, is often accompanied by unpleasant side-effects, and may be dangerous, it is definitely contraindicated. Patients with mild hypertension require reassurance, and, though perhaps kept under observation from year to year, they should not be infected with their physician's anxiety.

We can, as yet, give no clear answer to the pressing question whether drugs or operations improve the prognosis in that large intermediate group of patients whose moderately severe hypertension is beginning to produce ill effects. This is a problem that urgently requires solution, a solution that only careful clinical observation over many years can provide.

My thanks are due to all the physicians who have allowed me to see and treat their patients, to the assistants and registrars on the Medical Unit for their invaluable assistance, and especially to Dr. Michael Harington for his close co-operation in the treatment of patients with hexamethonium. I am grateful to him and to the Editor of *Clinical Science* for permission to reproduce Figs. 4, 5, and 6. My thanks are due to Messrs. Hambling and to Mr. Thomas Hooper for the skilful drawings of the fundus and to Mr. V. K. Asta and Mr. A. Bligh, of University College Hospital Medical School, for their assistance with the illustrations and plates.

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RECENT ADVANCES IN THE TECHNIQUE OF PROGRESSIVE RESISTANCE EXERCISE

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That skeletal muscle responds to contraction against systematically increased load by increase in power and hypertrophy has long been a matter of common observation. Indeed, the legend of Milo lifting a calf every day until it grew into a bull is evidence that the principles of progressive resistance exercise have been known since ancient times. A vast amount of experimental work, chiefly by physiologists on laboratory animals, has sought to demonstrate and explain this phenomenon (Morpurgo, 1897; Siebert, 1928; Steinhaus, 1933; Donaldson, 1935; Donaldson and Meeser, 1935; Hoffmann, 1947).

Clinically, progressive resistance exercise (P.R.E.) is now applied on a scientific basis, evolved partly by trial and error and partly by imitating in some measure the methods used by generations of weight-lifters. DeLorme and Watkins (1951) pay tribute to these athletes by pointing out that they have supplied a "rich heritage of empirical practice" which has been applied to physical medicine. It is now realized that the amount of load used clinically for resistance exercises is often inadequate, for weight-lifters and "body-builders" habitually use poundages far in excess of these in order to develop their massive hypertrophy and power, with no harmful effect in the absence of respiratory or circulatory disease.

It is not generally realized how much the actual technique of exercise has been changed in recent years, particularly by laymen practising P.R.E. for the purpose

of breaking Olympic weight-lifting records or developing the skeletal musculature. It is the object of this paper to describe the regimen for producing muscle hypertrophy and that for producing muscle power, a distinction not usually made in medical literature, and to consider their clinical applications.

Apparatus

For load-resisting exercises, ordinary inexpensive disk-loading barbells and dumb-bells are used (Figs. 1 and 2); they are almost indestructible and are simple to adjust. The dumb-bell rod, 1 in. (2.5 cm.) in diameter and 18 in. (46 cm.) long, can be easily adjusted for use as a swingbell when desired (Fig. 3). Useful additions are a neck harness (Fig. 4) and a pair of iron boots (Fig. 5). Experience has taught that this simple apparatus is better than helical springs, cycling machines, spring grips, torsion bars, and other forms of apparatus.

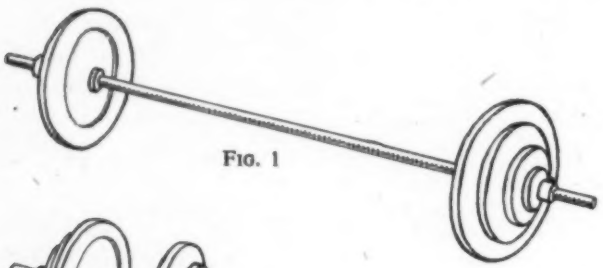

FIG. 1

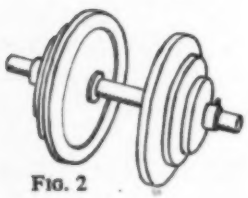

FIG. 2

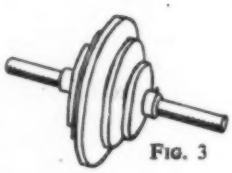

FIG. 3

FIG. 1.—Standard disk-loading barbell. Graduated iron disks loaded with 4 ft. (122 cm.) between inside collars on 6 ft. by 1 in. (183 by 2.5 cm.) bar. FIG. 2.—Standard disk-loading dumb-bell. Graduated iron disks loaded with 9 in. (23 cm.) between inside collars on 18 by 1 in. (46 by 2.5 cm.) bar. FIG. 3.—Swingbell. Graduated iron disks loaded centrally on standard dumb-bell rod, for use in certain two-handed exercises.

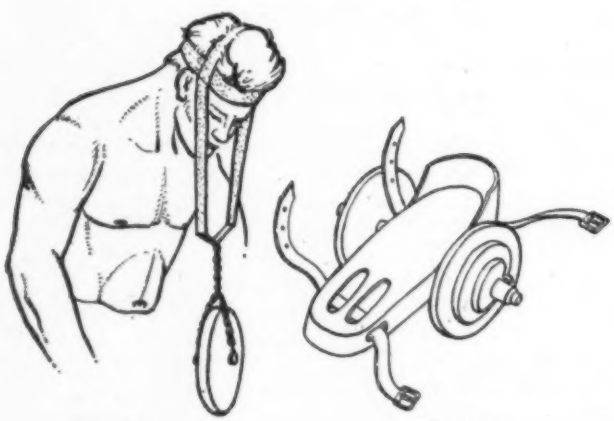

FIG. 4 FIG. 5

FIG. 4.—Neck harness. It can also be used so that weights hang from the back or side of the head, with exerciser lying in supine or lateral positions and the head extending beyond edge of table. FIG. 5.—Iron boot, cored beneath instep to receive a dumb-bell rod for increased resistance when desired.

In order to concentrate the resistance of weights on certain muscle groups, weight-trainers sometimes handle the weight while lying on "incline" or "decline" benches set at varying angles. A bench, the slope of which can be adjusted, is a useful adjunct for applying refinements of technique, and an ordinary gymnastic bench with hooks at one end for attachment at various levels to wall-bars can be used. A detailed description of the indications for the use of the incline and decline benches and other special equipment of the body-builder is beyond the scope of the present article.

The Hypertrophy or "Bulk" Programme

As the names suggest, this programme of exercises is designed primarily to stimulate muscle hypertrophy. Although such a programme will greatly increase the strength of the exercised muscles, it will not do so to the same degree as the "power" programme, described below.

The essential characteristic of the bulk programme is that all weight-lifting exercises are done in sets of lifts (or "repetitions"), the weight not being put down until the completion of a certain number (or set) of repetitions. In fact, it is colloquially known among weight-trainers as the "set system." A questionary sent to the seventeen area finalists of the 1953 "Mr. Britain" physique contest revealed that nearly all exercised on three days a week only (Monday, Wednesday, and Friday), and used the following system of resistance-repetitions :

Finalist	Sets	Repetitions
A	2	8–10
B	3	8
C	3	8
D	5–10	10
E	3–6	10
F	3	15
G	3–4	8–12
H	3	10
I	3	5–8
J	4	8
K	3	10
L	4	8
M	3–4	5–8
N	4–5	8
O	2–6	6–15
	Mean 3·7	9·16

In practically every case the weight used was the maximum that could be handled for the stated number of repetitions —for example, if three sets of ten repetitions were used, then every set was done with the ten repetition maximum (10 R.M.—the heaviest weight which can be lifted ten times). In the past, weight-trainers used to start with a weight less than the 10 R.M. and increased the load with each set of ten repetitions until the actual 10 R.M. was reached. This method has become obsolete, as it does not produce as rapid or as great an increase in muscular bulk as the set system employing the maximum weight that can be handled for every set of repetitions. Almost the only time when less weight is used is as a "warm-up" preparatory to the proper work-out. Furthermore, experience has shown that if less than the ten R.M. weight is used habitually for considerably more than ten repetitions and more than four or five sets are performed on one muscle group, then not only do the muscles fail to grow, but they may actually become smaller. In the experience of body-builders, such a system of "high repetition, low resistance exercise," although usually increasing stamina and muscular definition, never substantially increases muscular bulk.

For the lower limbs, particularly for the calf muscles, which are notoriously difficult to develop, exercises are done with higher repetitions. Typical examples of such schedules given on the questionary are :

Finalist	Sets	Repetitions
	Calves	
A	4	20
B	3	20
C	3	25
	1	20
D	Followed by 1	25
	" " 1	30
	Thighs	
A	3	20
B	3	15
C	4	8–12

To the question, "If you do your exercises in sets of, say, eight or ten repetitions, how often do you try to increase the amount of weight used?" the following answers were given:

Once a week	6 finalists
Every fortnight	5 "
Whenever I feel strong enough	3 "
Every few weeks	1 finalist
Between one to four weeks	1 "
As often as possible	1 "

It should be noted that only one man increased his poundage "as often as possible," for this method is characteristic of the power programme and these 17 men were body-builders. They were more interested in developing muscle hypertrophy than increasing power for breaking weight-lifting records.

The question "How often do you alter your lifting programme?" brought the following answers:

Every 4 weeks	1 finalist
" 4–6 "	1 "
" 6–8 "	1 "
" 2 months	3 finalists
" 3 "	2 "
Once a year	1 finalist
Whenever I feel stale and have reached a sticking point on a schedule	8 finalists

Frequent change in exercise routine, by varying the type of movements and sets of repetitions, is essential to prevent boredom and staleness, and, what is more important, to ensure continued progression.

Refinements of Technique in the Hypertrophy Programme

There are many refinements in the actual technique of exercise, but only the most important are mentioned here.

1. *"Flushing."*—Flushing is a method of exercising which is employed in the belief that it keeps the exercised muscles well flushed with blood throughout the exercise period. After carrying out the usual regimen for a particular muscle group, say three sets of eight repetitions on a movement in the vertical plane—for example, the "slow curl" as defined in the Official Handbook of the British Amateur Weight Lifters Association—the exercise is changed, and, using the same group of muscles, the weights are raised and lowered as in the "upright rowing" exercise. Alternatively, they may be grasped with the knuckles forward instead of backward (the "rectangular fix"). This method produces very rapid increase in muscle size. A temporary increase of as much as 1½ in. (3.8 cm.) can be made to the circumference of the upper arm in half an hour with this method of exercise.

2. *Muscle "Cramping."*—Muscle cramping is often practised immediately after flushing. More weight than can be managed over the full range of elbow flexion is added to the apparatus, which is then moved over a part of the full range. Alternatively, complete movements are first performed with a light weight; then, as the muscles tire, the action is shortened so that finally a motion of only a few inches is executed while the muscle is already almost completely contracted. This procedure can be tolerated for only a very few minutes, as the muscles soon start to ache intensely, probably because they are working under relatively ischaemic conditions. Very often a mottled flushing of the overlying skin occurs, similar in appearance to the "flare" of the "triple response." Sometimes even small subcutaneous blebs of oedema fluid may appear. Possibly the flare is produced by the accumulation of metabolites or by the liberation of a histamine-like substance within the muscle, causing local arteriolar dilatation by means of an axon reflex. It is very important that immediately after this form of exercise the muscles should be fully stretched so as to avoid any permanent shortening (muscle-binding) due to their being exercised over a limited range. For example, in the case of the biceps, the elbow should be fully pronated and extended and the upper arm abducted to a right angle and then extended with a series of jerking movements, thus stretching the muscle fully.

3. *Use of a Mirror.*—Body-builders are often derided as "looking-glass athletes" because they sometimes exercise in front of a mirror. But by exercising in front of a mirror the muscles can be watched as they contract and the athlete is thus able to concentrate very intently on the performance of the exercise, and consequently can very often handle more weight in front of a mirror than away from it. The underlying physiological reason adduced for this practice is to achieve cortical awareness of the muscles exercised, and, in order to get the proper "feel" of muscle in the cramping described above, the exerciser must practise by assuming slightly different positions until he is aware of the muscles being forced into extreme contraction. The incomparable Sandow was famed for his ability to flick at will practically any muscle in the body, and he claimed that this was one of the secrets of his outstanding development. The muscle-flicking alone did not develop his muscles; it was the practice of muscle control while actually lifting weights that was responsible for his success. Every successful body-builder since Sandow has had to master this technique of forcing the muscles into extreme contraction while lifting heavy weights, for it appears to be essential for maximal muscle hypertrophy. This technique comes easily to some, and they are often the "natural" strong men who seem to augment their musculature much more quickly than men who have difficulty in mastering this technique. But for the best results it must be mastered, and practice before a mirror is the surest way. Exponents of muscle control acquire a highly developed kinesthetic awareness. By lifting heavy weights in front of a mirror, the physical culturist improves his motor-learning and is able to lift more weight.

4. *"Peak Contraction" Principle.*—Exercising a muscle so that resistance is maximal at the peak of contraction has long been known by weight-lifters to produce rapid gains in size and strength. For example, in the knee-extension exercise with an iron boot (Fig. 6), resistance is maximal when the knee is completely extended—that is, at the peak of contraction of the quadriceps (and particularly of the vastus medialis). The principle is also applied to the elbow flexors by employing the peak-contraction barbell (Fig. 7). Another variation is to perform elbow-flexion movements with a dumb-bell while seated and leaning forwards ("seated dumb-bell curl"). In this way the forearm does not come above the horizontal position, even at the end of the movement. By the use of a little ingenuity the principle can be applied to other muscle groups.

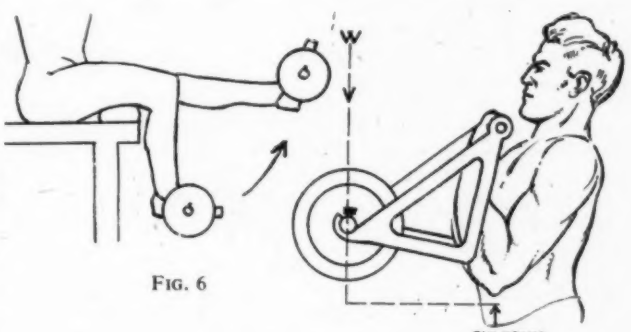

FIG. 6

FIG. 7

FIG. 6.—Knee-extension exercise for quadriceps. FIG. 7.—"Peak contraction" barbell. If elbow-flexion movements are performed grasping a standard barbell (Fig. 1) or dumb-bell (Fig. 2), the resistance diminishes once the forearm passes beyond the horizontal position. But with this apparatus the resistance continues to increase, and is maximal at the peak of contraction of the elbow flexors.

5. *"Cheating."*—Contraction of a single muscle to the complete exclusion of all others is most difficult, even for the expert at muscle control who spends many hours practising in front of a mirror. Body-builders have found that increasing the load so that it becomes necessary to "cheat" in order to perform an exercise—for example, by back-bending and the widespread recruitment of neighbouring muscle groups—often does more to develop the particular muscle

at which the exercise is primarily aimed than performing the same exercise in "strict" style, with the virtual exclusion of other muscle groups, and using less poundage. They cannot explain why this is so, but experience has proved that it is. It is part of their "rich heritage of empirical practice." Perhaps the cheating method, which enables a greater weight to be handled, although recruiting the contraction of neighbouring muscles, makes a greater demand upon the particular muscle being developed than does the method of lifting the maximum weight that can be handled in strict style.

From the consideration of these techniques two fundamental principles emerge: (1) the use of as great a resistance as possible over a relatively large number of repetitions, and (2) the concentration of the will on producing extreme contraction of a muscle while it is working against great and increasing resistance.

The Power Programme

This type of weight-training schedule is the one practised by aspirants to national and Olympic titles who strive to lift maximal weights. The weight-lifter is interested in power and not the massive muscular hypertrophy of the body-builder, and his training methods differ accordingly. But just as the body-builder, concentrating on a bulk programme, will concomitantly develop power far in excess of the untrained man, so will the weight-lifter unavoidably develop a certain degree of muscular bulk although following a power programme. Many weight-trainers, of course, use both types of programme, frequently alternating one with the other. In this way they succeed in developing an impressive, powerful, and symmetrical physique and probably become good enough lifters to compete in national contests. Indeed, it is believed, probably correctly, that the body-builder cannot develop a perfect physique by bulk schedules alone, and the top-class weight-lifter needs to incorporate in his training body-building or assistance exercises, performed as in a bulk schedule, in order to develop his maximal lifting potential. It is customary for newcomers to spend at least six months on body-building exercises before starting serious training for competitive weight-lifting.

The power programme is essentially one of decreasing numbers of repetitions performed with increasing resistance. Thus, starting with ten repetitions with the 10 R.M. on a particular exercise, the weight is increased by about 10–20 lb. (4.5–9 kg.) for the next set. Probably only eight, or even fewer, repetitions will be possible with the heavier weight. A further increase of 10–20 lb. (4.5–9 kg.) is made and as many repetitions as possible are performed, perhaps now only five or six. The weight is continually increased in this fashion, and as many repetitions as possible done until it is so heavy that it can be lifted only once. This is the lifter's personal record for that particular lift, or the "1 repetition maximum" (1 R.M.) of DeLorme (1945). As the 1 R.M. is approached the increments in the weight are made smaller so that perhaps towards the end of the work-out an increase of only about 5 or 2½ lb. (2.7 or 1.3 kg.) is made between one set of repetitions and the next.

Having reached the 1 R.M. the lifter may then make two or three attempts at lifting a weight which exceeds his 1 R.M. by about 5 lb. (2.3 kg.). Although not succeeding at first, the idea is to get the feel of the heavier weight, and with constant practice the day comes when he succeeds and establishes a new 1 R.M. By this time strength has usually increased so that he has also broken his 10 R.M. and is now able to start his work-out by doing ten repetitions with a weight perhaps 10 lb. (4.5 kg.) heavier than his original 10 R.M. The frequency with which 1 R.M.s are broken and new ones established depends on many factors, which include the natural lifting ability, intensity and frequency of practice, adequacy of food and sleep, temperament, and the amount of competition—for example, performance put up by fellow lifters in the club—number of "off days," etc.

Not every lifter attempts to exceed or even to reach his 1 R.M. at every work-out; some attempt it only once a week, others once a fortnight or even less often. But many do attempt it "as often as possible," and seem to get good results in terms of increased power and ability to set new records. Weight-lifters seldom start a work-out with as many as ten repetitions; eight is usually the maximum, and a proportion of lifters seldom exceed six repetitions. Generally, weight-lifters tend to exercise more often than body-builders. Five days a week is not uncommon, and more rarely six or even seven. The body-builders believe that alternate days of rest are essential for the anabolism of new muscle tissue, whereas a weight-lifter can go on increasing in strength without concomitant increase in bulk.

Refinements of Technique in the Power Programme

"Washer" or "Miniature Disk" Technique.—Instead of a 5 lb. (2.3 kg.) increase after reaching the 1 R.M., many lifters adopt the washer or miniature disk technique. Large iron washers, weighing about ¼ lb. (110 g.) each, are placed one on each end of the barbell. As the new weight now exceeds the 1 R.M. by only about ½ lb. (220 g.) it may be possible to perform a single lift with it, perhaps not in strict style, but cheating a little. After a few work-outs it becomes possible to do the lift in strict style, and a new 1 R.M. is firmly established. The ½ lb. (220 g.) is subsequently added throughout the whole range of the next series of descending repetitions—for example, 10, 8, 6, 4, 3, 2 repetitions—at the completion of which two washers are placed on each end of the bar for the 1 R.M. The process is then repeated.

Decreasing numbers of repetitions with increasing poundage, together with frequent attempts at increasing the weights used, particularly for the 1 R.M., is the key to the development of power. This principle can be applied in an almost infinite variety of ways, and is exemplified in the following training schedules:

	Weight	Sets	Repetitions
Schedule 1	90 lb. (40.8 kg.) (say)	2	4
	100 lb. (45.4 kg.)	2	3
	110 lb. (49.9 kg.)	2	2
	120 lb. (54.4 kg.)	2	2
	130 lb. (58.9 kg.)	Singles until failure	

Work up to six singles, then increase the weight by 2½ lb.–5 lb. (1.3–2.7 kg.) throughout the series.

Schedule 2.—Starting with the 6 R.M. and by decreasing repetitions and increasing poundage, work up to the 1 R.M. Having reached the 1 R.M., the following is carried out: 1-1-1-1-1-1; 1-2-1-1-1-1; 1-1-2-1-1-1; 1-1-1-2-1-1; 1-1-1-1-2-1; 1-1-1-1-1-2; then add 5 lb. (2.3 kg.) and revert to six single repetitions.

New Experimental Schedules

New training methods are always being tried and two of the more interesting at present on trial are here described.

The first is a "heavy-and-light" method, in which low repetitions are performed with maximum poundage and cheating allowed, if necessary, for about three sets of five repetitions only. This is followed by decreasing the weight and performing a single set of high repetitions—for example, twenty—in strict style. A modification of this heavy-and-light system is the "multi-poundage" method, in which the lifter does a few repetitions with a heavy weight, and, just as he is failing, say at about the sixth lift, assistants slide a disk off each end of the barbell. The lifter continues without resting and, as soon as he starts to fail with the lighter weight (say after three or four repetitions), two more disks are removed by the assistants, and so on, until about twenty repetitions have been performed. Another way is to start with a light weight, and after every three or four repetitions a disk is added to each end of the barbell until the lifter fails. Although effective, these methods have the disadvantage of requiring two watchful assistants, and are limited to two-handed exercises with a barbell, or the deep-knee-bend with a barbell across the shoulders.

The second new system is one which already seems to promise quite revolutionary gains in strength and bulk. It is the "everyday-hourly work-out." Only one to two sets of the 10 R.M. are performed every hour until ten sets have been completed. This is done every day, except for one rest day a week. Using a system of this type, a 20-year-old American, who started weight-lifting only about a year ago, has already broken by a wide margin several weight-lifting records in the heavyweight class.

Applications

Most weight-trainers participate in other physical activities besides lifting weights, such as running, swimming, gymnastics, etc., for they find that only by mixing other sports with weight-lifting can perfect proportions and fitness be achieved. Moreover, weight-training improves their performances in these other sports. A national weight-lifting coach has been appointed under the Ministry of Education Coaching Scheme, and the Amateur Athletic Association has adopted weight-training officially as a means of preparation for athletics. Weight-training for strength in sport and athletics is far more widely and intensely practised in those countries that led the field in the last two Olympic Games. The number of Olympic athletes who incorporate the principle in their basic training increases yearly (Nicol, 1954; MacQueen, 1954). Its application to the physical improvement of university students and schoolboys is also being extended (Adamson, 1952, 1953; Adamson and Morgan, 1954).

As regards physical medicine, DeLorme and Watkins (1951), in their admirable work on the subject, have stressed the superiority of weights over other apparatus. Strength and muscular development comparable to that of thousands of modern weight-trainers has not been produced in any individual by a "dynometer" or the other complex machines often used in physical medicine.

It will be noted that, in the set system described above, the weight used in every set was the maximum that could be handled for the stated number of repetitions—for example, three sets of 10 R.M. This differs fundamentally from the method of DeLorme and Watkins (1948), in which a fraction of the 10 R.M. is recommended for the first and second sets ($\frac{1}{2}$ and $\frac{3}{4}$ of the 10 R.M. respectively). As the "maximum" method has been proved to bring quicker and greater gains in strength and hypertrophy, it might be used with advantage in the medical application of P.R.E., in preference to the fractional system, which after long trial has been almost abandoned by weight-trainers. Also, whereas DeLorme and Watkins recommend exercising on five consecutive days a week, only three days, and these alternating with rest days, are used in the hypertrophy programme. In addition to the probable production of better results, this programme would reduce the necessary number of visits by the patient to the clinic.

Frequent change in exercise routine has been proved to be essential to ensure progression in the enthusiastic physical culturist. It is therefore important to vary the programme for patients, particularly as many lack enthusiasm for a heavy exercise routine.

It is suggested that exercising before a mirror might prove to be a valuable aid to motor-learning for patients unaccustomed to the intense contraction of localized muscle groups against heavy resistance. If the methods were combined with attempts at forcing the exercised muscles into extreme contraction, even better results might be obtained.

DeLorme (1945) has observed that when the knee-extension exercise is performed with an iron boot the resistance is maximal at the peak of contraction of the quadriceps, whereas with pulleys the resistance diminishes as the quadriceps is contracted. It might prove profitable to devise movements for applying the peak-contraction principle to many other muscle groups.

The success of the cheating method suggests that the importance at present attached in physical medicine to the strict performance of an exercise may be unjustified, and it may be undesirable to induce patients to try to use a single muscle without employing neighbouring muscle groups. In any case, for the patient with diseased muscles or impaired innervation, with no previous experience, it is often impossible to use a single muscle. Conversely, the vigorous contraction of neighbouring muscles against heavy resistance may involve a diseased muscle and thus promote contractions of a strength that the patient could not otherwise produce in it. Watkins (1948) has suggested that "cross-education might serve as a useful therapeutic tool in cases in which volitional control is unilaterally defective, or in which contralateral muscle groups are rendered temporarily inaccessible through immobilization." Contraction of neighbouring muscles might be even more effective than that of contralateral groups.

Conclusion

Which type of schedule, therefore, should be used—the "hypertrophy" or the "power"? Power is more representative of function than hypertrophy and more likely to be appreciated by the patient than bulk alone. But continued observation of patients in whom normal strength had been restored in the quadriceps muscle, but who had not regained normal thigh volume, revealed that their strength often deteriorated more rapidly than did that of the patients who had also regained normal muscle volume, and, moreover, hospital readmission was more frequent among men who had not recovered normal muscle volume (DeLorme and Watkins, 1951).

Only after the distinction between the two basic types of schedule is realized and the details of lay technique are mastered can we hope to juggle successfully with the enormous variety of resistance-repetition combinations.

Summary

Weights are superior to other, more complex, apparatus for developing skeletal muscle.

There is a distinction between the type of exercise programme used by weight-trainers to develop muscular hypertrophy and that used to develop power.

In the hypertrophy programme, muscle groups are usually exercised on alternate days, in three or four sets of eight to ten lifts, the weight used being the maximum that can be handled for the given number of lifts. If more sets and lifts are used habitually, the optimum resistance-repetition combination for producing hypertrophy is exceeded, and the muscles may even become smaller.

In the power programme, the commencing weight is never less than the maximum that can be lifted ten times. The weight is increased between each set of lifts, and the number of repetitions consequently decreases. Eventually the weight is so heavy that it can be lifted only once. Frequent attempts are made to increase the weights used.

Important refinements of technique, including "flushing," "cramping," "cheating," use of a mirror, and application of the "peak contraction" principle are described in detail, and two new experimental schedules are outlined.

Possible clinical applications of these techniques are discussed.

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CATTLE RINGWORM

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Although the transmission of ringworm from infected cattle to man can hardly have escaped the notice of farmers, the earliest observations recorded in medical literature were made at the end of the eighteenth century and in the early years of the nineteenth century. Ernst, a Swiss veterinary surgeon, described in 1820 the case of a young girl who was infected from a cow.

Gruby in 1843, and Malmsten independently in 1846 described the organism of *Tinea tonsurans*. Many dermatologists continued to deny the parasitic origin of ringworm, but it was accepted and confirmed by Bazin in France. In 1868 M'Call Anderson, of Glasgow, quoted Bazin's work at length and further confirmed the mycotic origin of ringworm transmitted from animals to man. Sabouraud (1894) soundly established the foundations of scientific mycology in his classic work on the dermatophyte and named species of *Trichophyton* transmitted from cattle and horses. He described the faviform trichophyta in 1893.

The Fungi of Cattle Ringworm

The nomenclature of the trichophyta remains confused, and there is no unanimity of opinion among mycologists concerning the identity or otherwise of certain species described in different laboratories. Moreover, some mycologists grant specific status to the variants and subspecies of other authorities.

So far as can be determined from the somewhat scanty literature, cattle ringworm in Western Europe and the United States is caused predominantly by two species of *Trichophyton—Tr. mentagrophytes*, a small-spored ectothrix, and *Tr. discoides* (syn. *Tr. album, Tr. ochraceum, Tr. faviforme*), a large-spored ectothrix. Little information is available concerning the distribution and the relative incidence of the two species. Those veterinary textbooks that make any distinction between the species of *Trichophyton* usually give greater prominence to *Tr. mentagrophytes* and its variants and subspecies. However, Walker (1950) stated that *Tr. discoides* is the commonest cause of ringworm in cattle in Britain, and that although *Tr. mentagrophytes* infections are common in man they are contracted from a wide variety of animals—horses, sheep, dogs, rabbits, and mice, as well as cattle. Davidson *et al.* (1934) grew *Tr. mentagrophytes* from seven cows during a three-year period at the University of Manitoba. La Touche (1952) reported 24 cases of *Tr. discoides* ringworm from the Leeds area. Similarly, recent reports from various areas in the United States (Fowle and Georg, 1947; Carney, 1949; Hoerlein, 1945; Jillson and Buckley, 1952) show a marked predominance of *Tr. discoides* infections, and in many of the reports this was the only fungus isolated.

Ringworm in Cattle

The incidence of ringworm in cattle is stated by some veterinary authorities to be high, but we know of no reliable figures. The incidence of the disease appears to vary widely in different parts of Britain, but it is far from uncommon in most rural areas and probably fluctuates greatly from year to year. Sylvest (1949) reported a rapid increase of ringworm infection in cattle in Denmark from approximately 1,000 infections for the year 1939 to over 8,000 for 1943. Calves are affected more often than older animals, which are less susceptible, unless they are in poor condition from disease or malnutrition (Hagan, 1951). The disease is uncommon in milch cows. Stall-fed cattle are more commonly affected than animals out at grass, and outbreaks of ringworm consequently occur, mainly in the winter months. Carrere, as long ago as 1838, before the cause of the disease was known, observed that the contagion might be spread by harness which had been in contact with the infected animals. Muende and Webb (1937) found colonies growing on faecal material in a stable.

It is now known that the fungus will survive for long periods in the debris around stables and for still longer periods on the woodwork of the actual building. Dark damp cowsheds are said to favour the spread of the infection, and infected cattle may recover rapidly without treatment when they are turned out to grass. It is not known whether this spontaneous cure is due to exposure to ultraviolet light or to improved nutrition. In the infected calf the lesions are most frequent on the face, commonly round the eye, on the neck, and around the tail. Broken and twisted hairs penetrate thick white or yellowish crusts composed of dried exudate and scales. The lesions are usually discoid and discrete. Experimental inoculation has shown that they first become evident about the eighteenth day after inoculation and are well established by the twenty-fourth day (Hoerlein, 1945). The eruption generally lasts from six to twelve weeks, the scabs falling off to leave scaly bald patches upon which the hair slowly grows again. If this normal course is disturbed, as is not infrequent, by rubbing and scratching, fresh outbreaks occur within the healed patches, and the condition may be prolonged for six to twelve months or even longer.

Incidence of Cattle Ringworm in Man

Here again no reliable figures are available. Our 39 cases were referred to various dermatological out-patient clinics in Glamorgan and western Monmouthshire over a three-year period (1950–3), during which time approximately 12,000 new patients were examined. A great many cases are undoubtedly treated by general practitioners, and others receive no medical attention. Ashton (1932) summarized the result of an inquiry made among 384 general practitioners in rural areas throughout England and Wales; 296 had seen cases of cattle ringworm (132 only rarely), but the annual incidence and the geographical distribution of these cases were not recorded.

Transmission to Man

The majority of patients give a history of direct contact with infected animals. Table I shows the source of contact with infection in this series. Of the three patients included

TABLE I

Adults		Children		
Farm Workers	Other Occupations	Living on a Farm	Father a Farm Worker	Recently Visited a Farm
23	3	5	1	6

under "other occupations," one was a driver of a cattle lorry, the second a miner with possible contact with pit ponies, and the third was open to risk in that his father worked on a farm. One case is omitted as the history was inadequate. It can be seen that mediate transmission is not uncommon in that one of the series was the daughter and one the son of a farm worker, but had not themselves visited the farm. Another patient was a child who had placed a calf's chain around her own neck. Others had apparently contracted the infection from gate-posts and trees against which infected cattle had rubbed themselves. A 5-year-old farmer's daughter presented with an extensive kerion-type infection of the scalp from which *Tr. discoides* was isolated. The same organism was isolated from the lesions on a calf from the father's farm. The child's father, knowing the calves to be infected, allowed her to look at them only through the byre gate, which had numerous smooth areas where the animals had rubbed their heads and necks. Scrapings were examined from various parts of the woodwork of the gate, but, as is often the case with this type of specimen, no organism was isolated.

Trauma sometimes determines the site of the lesions. The abraded epidermis perhaps offers particularly suitable conditions for the inoculation and initial growth of the fungus. Jillson and Buckley (1952) noted that a pre-existing skin lesion such as a contact dermatitis or herpes simplex may also serve as a locus minoris resistentiae.

The incubation period cannot often be accurately determined in farm workers with repeated contact with cattle. After trauma the lesions may appear within a few days. In the absence of trauma a longer incubation period is usual.

Age and Sex Incidence.—Five of the cases were in females and 34 in males. Table II shows the age incidence of our series. The figures are merely a measure of exposure to infection, and there is no definite evidence of any age or sex susceptibility. The age incidence suggests, however, that the older farm worker may have developed some immunity from previous attacks, is more careful in his avoidance of possible contact, or tends to treat himself and not consult his doctor.

TABLE II.—*Age Incidence*

Age	0–5	6–10	11–20	21–30	31–40	41–50	51–60
No. of cases ..	4	5	15	7	3	3	2

Seasonal Incidence.—The maximal seasonal incidence during the winter months coincides with greater prevalence of infection in cattle at this time (Table III).

TABLE III.—*Seasonal Incidence*

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
7	9	1	3	2	4	1	0	0	2	5	5

Distribution.—The majority of the lesions are on the exposed areas, particularly the scalp, face, neck, and arms, as is shown in Table IV. Of the nine patients with numerous infected sites, six had lesions of the face, neck, and scalp. Lesions on the trunk may be very extensive and by confluence may cover large areas. The four patients with lesions only on the lower limbs had two of these in the region of the knee. Several of our patients presented numerous lesions on buttocks, lower abdominal wall, and thighs.

TABLE IV.—*Sites Affected*

Face and Neck	Scalp	Forearm, Wrist, and Hand	Lower Limbs	Upper Arm	Trunk	Multiple Areas
9	2	13	4	0	2	9

Clinical Picture

Lesions of four types are encountered.

1. *Agminate Folliculitis* (Sabouraud).—Sharply defined dull-red plaques studded with follicular pustules.

2. *Kerion.*—An oedematous boggy mass of discharging follicular pustules, the surface of which is often crusted. The inflammatory appearance of this type of lesion occasionally leads to unnecessary surgical intervention.

3. *Tinea circinata.*—Erythematous plaques without pustulation. The surface is scaly, the margin of the extending plaque is vesicular, and there is little tendency to central clearing. The lesion may enlarge peripherally to cover extensive areas.

4. *Granuloma of Majocchi.*—Irregularly grouped nodules covered by red but unbroken skin.

The vast majority of the lesions in our series fell into groups 1 and 3. The scarring and alopecia left by the kerion-type infection is usually only very slight in proportion to the original extent and severity of the tissue reaction. Kerions, or more rarely agminate folliculitis, may be accompanied by a papular dermatophytid of perifollicular distribution and, as in three of our cases, usually on the trunk. This generally disappears spontaneously within a week, and is said sometimes to be precipitated by the administration of penicillin or by overactive local treatment.

The type of lesion and its duration perhaps depend on the degree of sensitivity to trichophytin, but may also be modified by the site, by any pre-existing skin lesion, and perhaps by metabolic or endocrine factors, as is the case with certain other trichophyton infections (Rothman, 1949). Kerions seldom develop except on the hairy parts. The nature of the lesion may change fairly rapidly, the tendency being for the reaction to become more inflammatory—for example, *T circinata* → agminate folliculitis or kerion. However, not all lesions evolve in this manner, and some may remain non-pustular.

We have twice observed an unusual mode of onset. One or more erythematous rings, weal-like and enclosing normal skin, have in the course of 48 hours become crusted, and removal of the crusts has revealed a typical kerion or agminate folliculitis.

The course of the disease is variable. The more inflammatory forms are self-limiting within a few weeks. *T. circinata* can persist for months if untreated. We have not encountered the granuloma of Majocchi, but this type of lesion also runs a prolonged course.

Mycology.—Cultural examination was undertaken only in random cases. *Tr. discoides* was isolated in all but two of these cases, from which *Tr. mentagrophytes* was grown.

Treatment

The more-inflammatory lesions require only symptomatic treatment. Irritating local applications should be avoided. Compresses of potassium permanganate (1:5,000) or mercury perchloride (1:2,000) are helpful, and manual epilation seems to accelerate cure. Occasionally the inflammatory reaction is very severe and the lesion is surrounded by an area of cellulitis. A short course of a sulphonamide is then preferable to penicillin, as, at any rate theoretically, the patient who is sensitive to trichophytin may also be sensitive to penicillin.

The less-inflammatory lesions require active treatment. Whitfield's ointment or one of the more recent fungicides should be applied. The risk of producing contact dermatitis with Whitfield's ointment or iodine, especially in children, should be remembered.

Discussion

Cattle ringworm is an unpleasant infection, distressing to the patient and sometimes leaving disfiguring scars, even though these are often less extensive than the severity of the reaction would lead one to expect.

A higher standard of hygiene in cowsheds, particularly the scouring of old woodwork and the application of disinfec-

tant solutions, might help to reduce the incidence of the infection in cattle. Early treatment of infected cattle would obviously lessen the risk to farm workers.

Summary

The literature on cattle ringworm and its transmission to man is reviewed. The disease is still frequent in some rural areas of Britain, but its real incidence is unknown.

Most infections in this country are caused by *Trichophyton discoides*, but *Tr. mentagrophytes* is responsible for some cases.

The records of 39 human cases observed in South Wales are analysed, and an account is given of the course and clinical features of the infection in man and cattle.

Treatment is briefly discussed. The acutely inflammatory infections are self-limiting, and the patient's discomfort is increased by irritating fungicides, which do not shorten the course of the disease and may produce a contact dermatitis.

Active treatment should be reserved for the less-acute cases.

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THE DOUBTFUL SYPHILITIC BLOOD TEST IN PREGNANCY

BY

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Blood tests for syphilis are now a routine procedure in almost all antenatal clinics in this country, but they are far less often carried out on expectant mothers attended by their family doctors. As a result, nearly all cases of infantile congenital syphilis seen nowadays are in infants of women who have not attended clinics. An exception to this is described below.

Of the pregnant women tested by the regional blood transfusion centres in six provincial cities in 1952, 0.35% were found to have a positive syphilitic reaction (Ministry of Health, 1952). The majority of these latter gave repeatedly strongly positive results or a definite history of syphilis, and obviously needed treatment for their own and their child's sake. Difficulty arises, however, in the occasional case in which there is a repeatedly weakly positive blood reaction unsupported by history or signs. Naturally, for psychological and family reasons, any suggestion of syphilis in a pregnant woman is to be avoided if possible, but delay in treatment may be fatal to the child. In a patient with weak serological reactions the decision has to be made whether the patient is a true though weak syphilitic reactor or a non-treponemal reactor. Rein and Kostant (1952) rightly state that it is not safe to assume that standard serological reactions are of the non-treponemal type unless they are checked by a Nelson's treponemal immobilization test. And it is no exaggeration when Moore and Mohr (1952) say that the use of this test permits for the first time a definite answer to the question, "Does this patient have syphilis?" But, as Price (1954) pointed out, the test is so complex and time-consuming that to advise it in this country, where it is carried out in only a few laboratories, is a counsel of perfection, and a decision to treat or not may have to be made without it. Routine blood tests are usually done at the third or fourth month of pregnancy, and probably the earlier treatment is given the less chance there will be of foetal infection.

Before penicillin was in general use for the treatment of syphilis (and no other substance should be used nowadays) the clinician was faced in doubtful cases with the problem of subjecting the woman to a long course of dangerous injections with the arsenicals and bismuth, or of taking the risk of not treating her before delivery and, if the worst happened, of treating her and her syphilitic child post-natally (Stokes and Ingraham, 1939). But now that penicillin can be used—an entirely safe and effective form of treatment—it is essential that an "insurance" course should be given to all mothers who have the slightest serological suggestion of syphilis, unless they can be proved to be non-treponemal reactors (Rein and Kostant, 1952). That the signs of infantile congenital syphilis usually respond well to penicillin treatment must be admitted, but obviously it is better to treat the foetus *in utero*. Without treatment it might suffer permanent damage, die before term, or be born so marasmic that nothing would save it.

If treatment has to be given without a definite diagnosis beforehand, the problem should be explained to the mother so far as is possible. It can be emphasized that the aim is to protect the child against a remotely possible danger. Her own case and that of her husband can be investigated at leisure.

The following case is of interest as it demonstrates the danger of not treating a mother whose serological reaction is repeatedly weakly positive in the absence of a test which would prove the reactions to the standard tests for syphilis to be non-treponemal in nature.

Case Report

An intelligent woman aged 31, German by birth, but speaking good English and married to an Englishman, attended a London antenatal clinic from the time that she was four months pregnant. She gave a history of having been married previously to a German soldier who had been killed towards the end of the war and of having two healthy children, now aged 9 and 7, by him. She gave no history of disease suggestive of syphilis, or of injections, and said that she had had a blood test before she came to England as a displaced person after the war. She thought the result of the test was negative. At the antenatal clinic there were no signs of syphilis, and her blood test at 5 months was Wassermann doubtful, Kahn positive; at 6 months, Wassermann doubtful ("possibly false positive"), Kahn negative; and at 6½ months, Wassermann and Kahn negative. No further tests were taken, and she was delivered at term of an apparently normal male child. He appeared to thrive at first, but at 4 weeks he became restless, and had an enlarged abdomen and nose-bleeds. At 7 weeks he was admitted to a children's hospital obviously very ill with a blood-stained nasal discharge, a generalized rash, and a greatly enlarged liver and spleen. He was jaundiced and had oedema of the lower limbs. The Wassermann reaction and Kahn test were strongly positive, and *x*-ray examination

showed periostitis and osteitis of the tibial shafts. The child was treated with penicillin and bismuth and rapidly improved.

When he was brought to this clinic at the age of 4 months he appeared to be quite normal apart from an enlarged liver. His Wassermann reaction was negative, the Kahn test was weakly positive, and *x*-ray films of the tibiae showed healed periostitis. A month later the liver appeared to be normal and the blood tests were negative. The serological reactions have remained negative up to the time of writing, when the child was aged 2 years, and he seemed to be remarkably healthy. When the mother was first seen at this clinic four months after delivery she had no signs of syphilis and had had no treatment. Her Wassermann reaction was negative and the Kahn test weakly positive; both the cerebrospinal fluid and chest *x*-ray film were normal. She told us that she had been raped in a Russian P.O.W. camp in 1945 and thought that she may have been infected then, though she had no signs and had never had any treatment. She denied extramarital intercourse since then, and said that she had never had penicillin at any time. She was given routine penicillin treatment, and three months later her blood tests were sero-negative and have remained so for 20 months. The two older children and her present husband were examined. There were no signs of syphilis and all their blood tests were negative. The husband said that he had had balanitis during the war, but afterwards had had several blood tests which were negative, and he had never had penicillin.

In such a case it must not be forgotten also that the serological reaction is only part of the puzzle which has to be fitted together to make the diagnosis of syphilis. The whole picture, including the history of the patient, the family, and the husband, and the clinical signs, must be correlated. If, after that, doubt is still present, it is safer to treat than risk permanent damage to the child.

Summary and Conclusions

The problem of the weakly positive blood test for syphilis in pregnancy is discussed.

It is suggested that, if the weakly positive blood tests cannot be shown to be non-treponemal in nature, "insurance" treatment should be given to the mother as early as possible in pregnancy.

A case is described in which a woman with no history of syphilis but whose blood tests were repeatedly weakly positive gave birth to a child with marked signs of syphilis and strongly positive blood tests. The father of the child was not infected.

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In his recently published annual report for 1953, Dr. K. A. SOUTAR, county medical officer of Surrey, states that the number of confinements taking place in hospitals has increased and the number of domiciliary confinements has decreased. Of the total births in the county, 72% took place in hospitals and 22% in the mothers' homes. A survey carried out in Surrey during the past two years showed that even though there were no medical or social reasons for hospital confinement a number of women went to hospitals to have their babies. In general, maternity units are keeping mothers in hospital for 10 days after the confinement. This is the minimum period permitted by the Central Midwives Board. Dr. Soutar thinks that there are enough maternity beds in the county for it to be well worth while to consider the advantages of extending the stay in hospital to at least 14 days.

A RATIONAL APPROACH TO PROSTATECTOMY

BY

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It seemed necessary to write this short paper, an affirmation of certain principles, in view of the trend of the literature about prostatectomy at the present time. A study of recent papers would induce the superficial reader to think that a uniform operation was all that was required. The fact that different writers advocate different operations gives the clue to the present muddle.

Obstruction at the bladder neck is due to a variety of causes, and no single operation can possibly cover all these different types.

It is necessary to choose the correct treatment for each type of obstruction—in fact, for each particular patient (Cosbie Ross, 1936). Although obstruction at the bladder neck in the elderly patient may be due to an adenomatous enlargement, it may also be caused by carcinoma, a median bar, "sclerosis" of the bladder neck, an adenoma arising in one of the glands of the prostatic urethra, Marion's disease, etc., and I suggest that it is unnecessary and unwise to submit *all* these patients to a suprapubic operation when some of them can be dealt with more effectively by perurethral methods. A recent paper describes all types as being treated by the Wilson Hey operation irrespective of whether the cause was adenoma or carcinoma.

At the Urological Department of the Sefton General Hospital the figures for the year 1952 (see Table) emphasize the range of treatment required for dealing with this complex condition.

Operations Carried out for Obstruction at the Bladder Neck in 1952

Retropubic prostatectomy	16
Wilson Hey ,,	12
Cold punch ,,	25
Suprapubic prostatectomy with drainage	9

I have always thought that Wallace's (1951) views have not, so far, received the considerations and weight they deserve. Wallace suggested that it is the amount of muscular tissue in the region of the bladder neck which is the big factor. He pointed out that dogs grow large prostates in old age but never have retention, because there is no muscular tissue at the bladder neck. He investigated, by differential staining, wedges of the bladder neck removed at operation and at post-mortem examination in a large series and distinguished the relative amounts of muscle and fibrous tissue. He found that a small adenoma with a well-developed musculature at the bladder neck was likely to cause obstruction, whereas a much larger adenoma with poorly developed musculature was compatible with a normal bladder and satisfactory micturition. He found many muscular fibres in cases of "sclerosis" of the bladder neck and in Marion's disease, and quoted the action of ephedrine in precipitating acute retention. There seems to be little doubt that Wallace's findings explain many anomalies in obstruction at the bladder neck.

It is, of course, well known that not all patients with mild prostatic symptoms require operation. Chapman (1949), in a most interesting paper, showed that if a number of

patients with mild prostatic symptoms were followed up for a prolonged period some of them did not appear to change, and remained *in statu quo* indefinitely as regards both symptoms and residual urine. He mentioned the three classical types of prostatic enlargement—progressive type, sudden acute retention without previous symptoms, and silent prostatic obstruction without marked urinary symptoms—and thought that a fourth category consisting of the non-progressive cases should be added. In this fourth type there is no deterioration over the years, and when death occurs some other cause is responsible.

Conservative measures include regular two-hourly evacuation of the bladder, "double micturition," restriction of fluids after 7 p.m., and avoidance of prolonged cold journeys leading to overloading of the bladder.

On the other hand, if there is troublesome nocturia and an appreciable residual urine surgical measures are necessary.

Chronic Retention of Urine

It is agreed by all authorities that patients with chronic retention of urine require certain investigations before operation, including a straight *x*-ray film of the urinary tract, an intravenous pyelogram, a blood urea estimation, and microscopical examination of the urine. These investigations are bare essentials, and it is also necessary to investigate the cardiovascular and respiratory systems of these elderly and frequently decrepit old men. It is the patient with an acute retention superimposed on the chronic retention about whom there is the greatest controversy. It is in this type that many surgeons advise and practise "immediate prostatectomy" without any investigation or preparation whatsoever, a policy which to me seems to be both dangerous and unnecessary. If it is advisable to investigate the chronic retention it is even more necessary to investigate the acute retention superimposed on the chronic. These patients are delicately poised on a knife-edge, with uraemia on one side and urinary infection on the other. Apart from any other consideration these men need several hours' preparation, as many have voluntarily restricted their fluid intake, perhaps for weeks, and are consequently dehydrated.

The pain of the retention can be overcome by inserting a Barker lumbar-puncture needle suprapubically and allowing the urine to drain through a fine rubber tube. The lumbar-puncture needle, the correct angle of which is maintained by transfixing a large flat cork which is strapped to the abdominal wall, can be left *in situ* for twelve hours, if need be, while the necessary investigations and preparations are carried out. The use of the needle does not prejudice the subsequent operation, whatever it may be.

Preliminary Cystoscopy

Up to the point where the patient has entered the theatre no catheter should be passed through the urethra. It is not necessary to be fanatical on this single point, and many prostatectomies with closure are carried out successfully in spite of catheterization before entering hospital. It remains, however, a hard fact that catheterization before operation diminishes the prospects of speedy and successful treatment.

Once the patient has been anaesthetized, however, there are great advantages in carrying out a cystoscopy before beginning the operation. These advantages include : (1) A stricture of the urethra becomes immediately apparent and the humiliating experience of discovering that a urethral stricture is the real obstructive factor *after* removal of a harmless prostate is avoided. (2) Minute papillomata, which may be overlooked when the bladder is opened, are seen, and are treated with diathermy. (3) A careful inspection of the obstruction, combined with a digital examination with a finger in the rectum while the cystoscope is still *in situ*, will confirm the preliminary impression regarding the best method of dealing with this particular patient. At the same time a doubtful prostate may be found to be carcinomatous, thereby avoiding a pointless and sanguinary attempt to enucleate a malignant lesion.

Operation

At the cystoscopy a final decision is made on the operation required. I believe that most of the operations advocated have a place in treatment, with the exception of the perineal prostatectomy, with which I have not had much success. (1) The retropubic or Millin operation is best for the large prostate in which there is ample expanse of capsule available for suture. The clear and direct view of the cavity facilitates diathermy of bleeding-points. (2) The Wilson Hey or transvesical operation seems to be best suited for medium enlargements and also for cases in which the cystoscopy reveals some concomitant condition in the bladder such as a diverticulum. (3) Perurethral resection is most suitable for the median bar, for "sclerosis" of the bladder neck, for Marion's disease, etc. I personally prefer the Gershom-Thomson cold punch, but equally good results are obtained using such modifications of the McCarthy resectoscope as the Reid-Nesbit machine.

Perurethral resection is, moreover, the right and proper operation for carcinoma of the prostate. The diagnosis is confirmed microscopically and at the same time the obstruction at the bladder neck can be removed. The operation can, if necessary, be repeated should the obstruction reform at a later date, but it is surprising how infrequently this is required.

Bad-risk Patients

I would like to say a final word about bad-risk patients, who are all too familiar. They fall into two clearly defined groups : (1) The patient admitted to a medical ward with congestive cardiac failure, hemiplegia, or some other serious medical condition complicated by acute retention of urine, probably superimposed on a long-standing obstruction. (2) The patient admitted with retention whose investigation reveals extremely poor renal function. In such a patient there is no secretion in the intravenous pyelogram and the blood urea is considerably raised. I would add to these groups the patient with mental "clouding" and disorientation.

In either of the groups a suprapubic operation, whether Wilson Hey or Millin, must carry a great risk. It is not necessary to take this risk. Instead, a Riches (1943) catheter is inserted suprapubically, and operation is postponed until the medical condition has been dealt with or the renal function has improved, as it undoubtedly does in most cases. When the operation is eventually carried out in this type I usually find that it is safer to confine myself to the perurethral method, as this puts little strain on the patient, but the previous insertion of a Riches catheter does not prevent a subsequent suprapubic operation, either Wilson Hey or Millin.

I will conclude by quoting from a paper I wrote in 1936. "A study of recent papers suggests that urological opinion is sharply divided into two well-defined schools of thought. Some authorities consider the suprapubic approach essential in all cases, while others urge transurethral resection for even the largest prostates. Impressive series of cases and their excellent results can be, and are, shown by both sides. When opposing views are thus held on medical problems it is customary to find that the truth lies at some intermediate point, and it is our duty to determine so far as possible its approximate site."

Summary

Obstruction at the bladder neck is due to a variety of causes, and consequently different methods of treatment and different operative procedures are required in dealing with these diverse lesions.

It is important to carry out certain minimal investigations on all patients, whether suffering from chronic retention of urine or acute retention on chronic.

A cystoscopy, carried out immediately before the operation, is of great help in confirming the diagnosis and in deciding whether the suprapubic or perurethral approach is indicated.

In the bad-risk patient it is safer to insert a Riches catheter under local analgesia and to await improvement in the general condition or in the renal function before undertaking prostatectomy.

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IDIOPATHIC HYPOPARATHYROIDISM PRESENTING AS DEMENTIA

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Idiopathic hypoparathyroidism is a rare condition which presents in a variety of ways and which, once diagnosed, is very amenable to treatment. The subject has recently been fully reviewed (de Mowbray *et al.*, 1954), and we shall therefore confine ourselves to a few comments.

The criteria for diagnosis were discussed by Drake *et al.* (1939). They include chronic tetany, low serum calcium, and high serum inorganic phosphate with normal renal function. Other features often found in these cases are epileptiform attacks; mental changes; cataracts; defects in other ectodermal structures such as dryness and coarseness of the skin, cutaneous calcium deposits, thinness and scanty growth of hair, trophic changes in the nails, and poor dental development, with failure of eruption, faulty enamel, and acalcification of the dentine (experimentally produced in rats by Erdheim in 1911, quoted by Albright and Strock, 1933). Radiographic changes include symmetrical calcification of the basal ganglia and thickening of the cortical layers of the long bones. The aetiology of the condition is still obscure.

The pathology was discussed by Drake *et al.* (1939), who found that in one case at necropsy all four parathyroid glands were present and appeared macroscopically normal, but consisted histologically of an excessive number of fat cells, replacing the normal epithelial cells. In 1946 Leonard (quoted by Albright and Reifenstein, 1948) described a case in which the parathyroid glands were absent. Occasionally idiopathic hypoparathyroidism was found to be associated with other endocrine disorders such as Addison's disease or hypothyroidism. More often, monilia infection of the nails and mucosae was observed.

Cases occur in any age group, but the majority appear to have been found either in childhood or between 38 and 52 years. Our case is of interest because of the late onset of the symptoms and the mode of presentation.

Case Report

The patient, a widow aged 61, was admitted to the Whittington Hospital on February 11, 1954, with a diagnosis by her doctor of status epilepticus. No reliable history could be obtained either from her or from her relatives, but it seemed that her symptoms had begun seven years before admission, shortly after the death of her husband, with depression and gradually increasing loss of interest in her surroundings and her appearance. Some time after the onset bilateral cataract operations had been performed. For several years she had occasionally complained of numbness and tingling in the legs. In 1951 she had attended the outpatient department of the National Hospital, Queen Square, with giddiness and tremors of the hands; mild anxiety symptoms were observed, and an *x*-ray film of the skull showed calcification of the basal ganglia. Although asked to attend again, she had failed to do so and was not seen again at any hospital until her present admission. Since 1952 there had been episodes of urinary incontinence, and "fainting spells" had occurred in the past six months; twitching of the limbs had been observed in the past three months. For the past five weeks there had been considerable mental deterioration, with confusion and loss of memory. The first epileptiform attack had occurred two days before admission. From the description given by the relatives this had consisted of generalized tonic and clonic contractions preceded by a cry and followed by two hours' sleep. Several similar attacks had occurred in the next forty-eight hours.

On arrival in hospital the patient was conscious but disorientated, apathetic, and unable to concentrate. She attempted to co-operate in the examination, but could not give any details of her illness or carry on a rational conversation. Her general condition was one of extreme neglect; she was thin and pale, and doubly incontinent. The heart, lungs, and abdomen were normal and the blood pressure was 150/95. The only teeth present were the upper four incisors, which were misshapen and carious. She had a slurring dysarthria and a fine lateral nystagmus. Bilateral iridectomies had been performed and both lenses had been removed. The fundi showed choroido-retinal degeneration; there was no papilloedema. All tendon reflexes were diminished and neither ankle-jerk could be obtained; both plantar responses were feebly extensor. Otherwise the central nervous system was normal.

During the first few days in hospital atypical epileptiform attacks were witnessed, in which a hoarse cry was followed by tonic contractions involving the whole body. Between these the patient lay in bed showing no kind of initiative and had to be fed and washed. It was observed that she frequently adopted a position of flexion at the large joints of the arms and legs, with occasional writhing movements of the arms. No improvement was obtained with phenobarbitone. On the twelfth day of her stay in hospital definite attacks of tetany with carpal spasms were first seen. Chvostek's sign was positive; biochemistry at this time was as follows: serum calcium, 6.5 mg. per 100 ml., repeated the following day, 5.1 mg.; serum inorganic phosphate, 10.4 mg. per 100 ml.; and serum alkaline phosphatase, 4.5 King–Armstrong units. Renal investigations, estimation of faecal fats, and alkali reserve were normal.

FIG. 1.—Radiograph showing calcification of basal ganglia.

X-ray examination of the skeleton showed slight cortical thickening of the long bones, some periosteal new bone formation in the fibulae, and calcification of the basal ganglia (Fig. 1). The two upper eighth and one upper seventh molar teeth were unerupted. An electrocardiogram (Fig. 2) showed the prolonged Q-T_e interval found in hypocalcaemia, and low T waves in the standard leads. There was no evidence of previous thyroid operation, and the diagnosis of primary or idiopathic hypoparathyroidism was made.

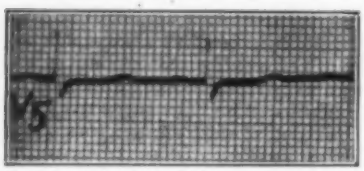

FIG. 2.—Electrocardiogram on February 26, showing Q-T_e prolonged (0.45 second). Serum calcium, 5.8 mg. per 100 ml.

Treatment was begun on the same day with an intravenous injection of 10 ml. of 10% calcium gluconate, with no apparent immediate effect on the muscular spasms. In addition, oral treatment with 5 ml. of dihydrotachysterol (A.T.10), and 60 gr. (4 g.) of calcium lactate daily, was started. On the next day no further generalized spasms occurred, but the carpal spasms continued at short intervals, and the dose of dihydrotachysterol was increased to 20 ml. daily. The patient's general condition began to improve, and on the following day the carpal spasms ceased. Chvostek's sign remained positive to a diminishing degree for more than four weeks. By that time she had ceased to be incontinent, was able to walk normally, and spent most of the day out of bed. Her mental state had improved

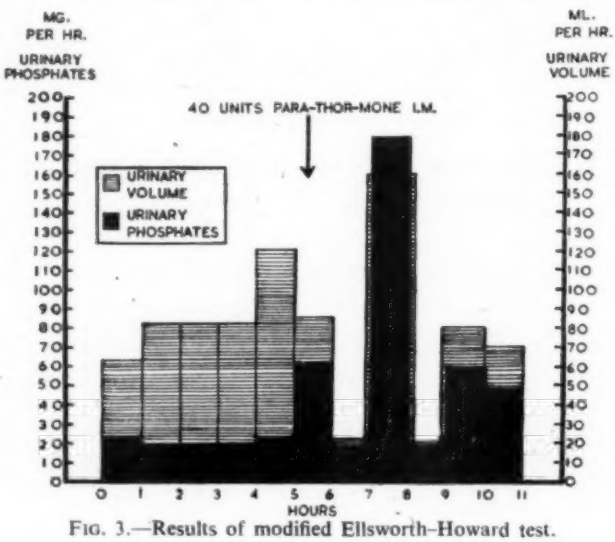

FIG. 3.—Results of modified Ellsworth–Howard test.

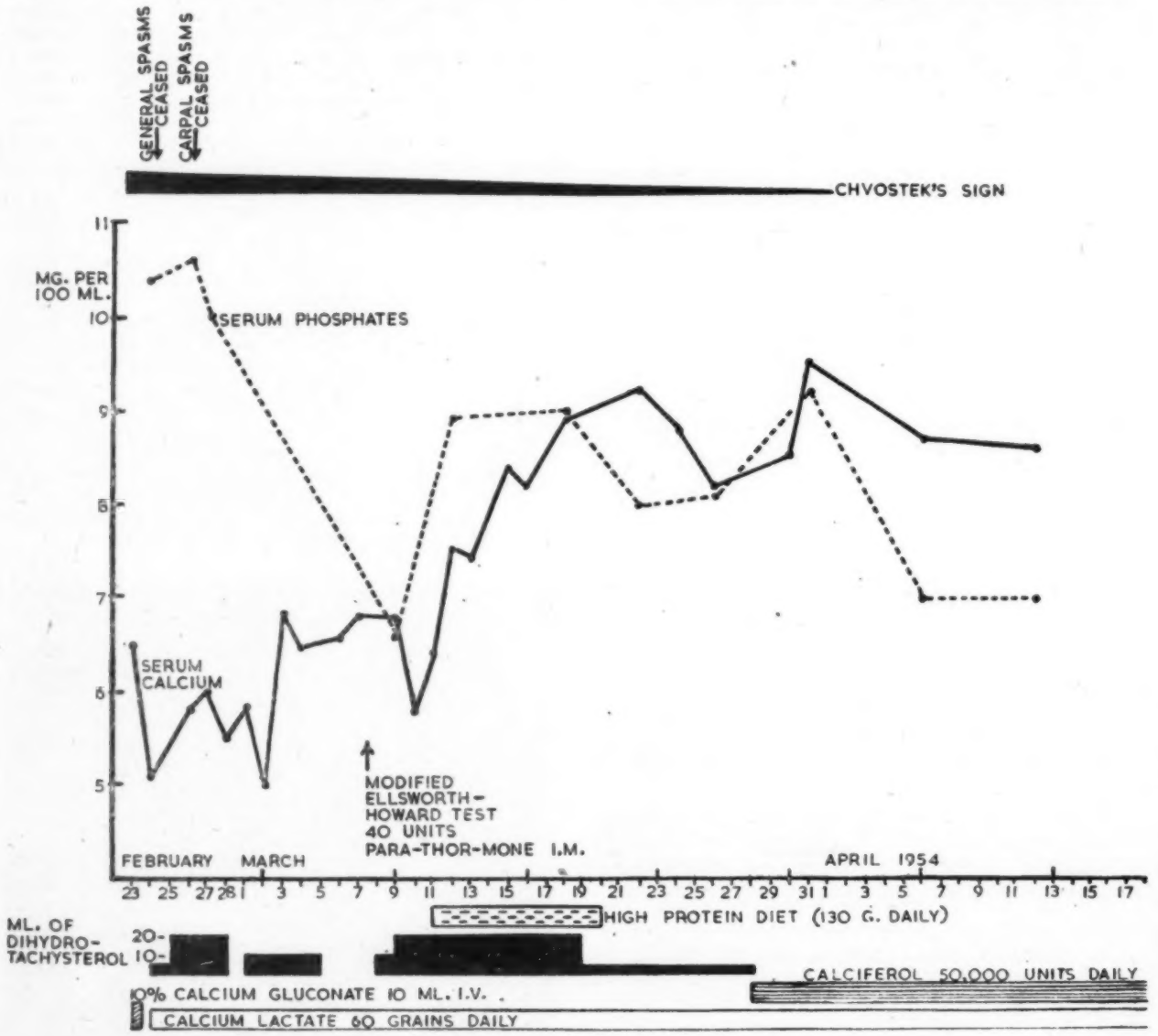

FIG. 4.—Response of serum calcium and phosphates to treatment.

to a remarkable degree. She was normally oriented and took an intelligent interest in her surroundings and in her own progress.

In the first two weeks of treatment the improvement in the biochemical changes did not keep pace with the clinical recovery. The initial rise of serum calcium was slow, despite high dosage with more than one batch of freshly obtained dihydrotachysterol. The serum calcium levels remained below 6 mg. per 100 ml. during the first and below 7 mg. during the second week. We considered the possibility of pseudo-hypoparathyroidism (Albright *et al.*, 1942; Reynolds *et al.*, 1952). After discontinuing dihydrotachysterol for three days, a modified Ellsworth–Howard test was carried out (Fig. 3). This showed that an intramuscular injection of 40 units of "para-thor-mone" was followed by a normal rise in urinary phosphate excretion, and there was therefore no support for this diagnosis. Resumed treatment with dihydrotachysterol eventually resulted in a slow restoration of the serum calcium to near-normal levels, aided possibly by a high protein intake of approximately 130 g. daily (Jordan and Kelsall, 1951). The serum inorganic phosphate had fallen, but remained somewhat above normal levels (Fig. 4).

In the fourth week of treatment it became possible to reduce the dose of dihydrotachysterol to 3 ml. daily; later calciferol-forte, 1 tablet daily (=50,000 units=1 ml. dihydrotachysterol) was substituted for reasons of convenience for the patient, and she was eventually discharged from hospital on this maintenance dose on April 20, 1954.

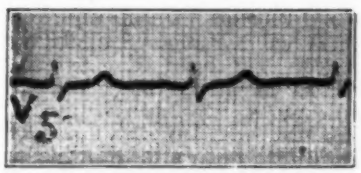

FIG. 5.—Electrocardiogram on March 22, showing Q-T_c normal (0.35 second). Serum calcium, 9.2 mg. per 100 ml.

The dosage of dihydrotachysterol and calciferol was controlled by means of repeated serum calcium estimations, because tests for urinary calcium excretion with Sulkowitch's reagent often gave misleading results. On several occasions the tests indicated normal serum calcium levels when in fact these were below 7 mg. per 100 ml.

Four weeks after the beginning of treatment the electrocardiogram had become normal (Fig. 5).

An electroencephalogram at that time showed a slow dominant activity of about 6 cycles per second, and the record was not of epileptic significance (Dr. Douglas Gordon). Of the various electroencephalographic changes found with hypoparathyroidism, slow waves, of about 2–5 c/s, have been associated with low serum calcium. They occur singly or in series, with occasional spiking, and remain unchanged when a transient rise of the serum calcium level is produced by intravenous injection of a calcium salt; they tend to disappear when the serum calcium is permanently maintained at normal levels (Gotta and Odoriz, 1948). In our case the electroencephalogram was done after the elevation of the serum calcium level, and the abnormal waves were not seen.

Some months after treatment had begun horizontal ridges appeared across the finger- and thumb-nails (Fig. 6).

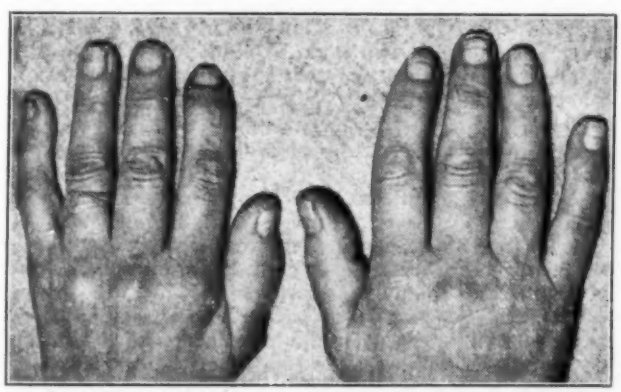

FIG. 6.—Finger-nails four months after starting treatment, showing a transverse ridge halfway along each nail.

Discussion

It has been emphasized previously that idiopathic hypoparathyroidism may simulate idiopathic epilepsy or cerebral tumour. In our case this condition presented as dementia. The common feature of these three modes of presentation is the incidence of epileptiform attacks.

Generalized muscular contractions in hypocalcaemia have been thought to originate in one of three ways. (1) The low serum calcium level may precipitate epileptic attacks in latent coexisting epilepsy with electroencephalographic changes (Jordan and Kelsall, 1951). (2) Cerebral oedema due to low serum calcium may provoke epileptiform attacks which subside with adequate treatment of the hypocalcaemia but are not abolished by phenobarbitone. There is experimental and necropsy evidence for the production of such oedema. Perfusion of a frog's leg with a solution containing a low concentration of calcium chloride caused oedema, which did not appear with higher concentrations (Hamburg, quoted by Albrecht, 1923). Cerebral oedema was found at necropsy in children who had died of infantile tetany (Grant, 1953). The epileptiform attacks in our case may have been of this type; the electroencephalogram after elevation of the serum calcium was not of epileptic significance, and there was no improvement with sedatives, but prompt relief with dihydrotachysterol. (3) Increased peripheral nervous irritability may cause widespread tetanic spasms, which may resemble attacks of Jacksonian epilepsy.

Occasionally epileptiform fits in hypoparathyroidism have been associated with papilloedema and raised pressure of the cerebrospinal fluid, and have then simulated cerebral tumour. In our case there was no papilloedema, and the pressure of the cerebrospinal fluid was normal.

Like many other endocrine diseases, hypoparathyroidism may be complicated by mental changes, but in the present case these were predominant, and the initial differential diagnosis seemed to lie between the organic dementias, with epileptiform attacks amongst the associated features. After exclusion of the commoner types, the provisional diagnosis of pre-senile dementia of the type of Pick or Alzheimer was made. Hypocalcaemia was not at first suspected because the usual appearance of tetany with carpo-pedal spasm was absent; later carpal spasm was observed, but even then true main d'accoucheur did not develop.

The diagnosis of idiopathic hypoparathyroidism in the absence of frank tetany may be suggested by calcification of the basal ganglia (Camp, 1947), which, although not confined to this condition, is found in a high proportion of cases. Confirmation is afforded by the unequivocal biochemical changes.

Summary

A case of idiopathic hypoparathyroidism of late onset is described, and its mode of presentation as dementia is emphasized. Other cerebral manifestations of this condition, as well as some diagnostic features, are mentioned. Treatment—started with dihydrotachysterol, continued with calciferol, and controlled with serum calcium estimations—resulted in a striking improvement in the mental state.

We would like to thank Dr. A. L. Jacobs for his help and permission to report the case; and Dr. N. Gordon for information about the patient's first attendance at hospital.

ADDENDUM.—The patient has been seen in the out-patient department since this paper was written, and she has remained well. Her mental state is normal, there have been no epileptiform attacks and no recurrence of tetany, and she has gained weight. The serum calcium has been kept

between 7.5 and 9 mg. per 100 ml. However, towards the end of May, 1954, about three months after the beginning of treatment, she began to exhibit involuntary movements of the left arm and leg. They were choreiform, and, apart from sudden facial grimaces, strictly unilateral. Dr. Michael Ashby, neurologist to the Whittington Hospital, stated that they were virtually identical with those seen bilaterally in Huntington's chorea, especially in regard to the fleeting grimaces. These involuntary movements must be regarded as being due to a lesion in the basal ganglia. Although this is the site of the calcification in hypoparathyroidism, such movements have not, so far as we are aware, been previously recorded in this condition. It is possible that the arteriosclerosis in our patient, who is older than most of those whose cases have been reported, is a factor in producing this interesting new feature.

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PSYCHIATRIC ILLNESS IN THE ELDERLY

A FOLLOW-UP STUDY

BY

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The increasing expectation of life has important implications for medicine, and not least for psychiatry, since the incidence of mental illness increases with advancing years. Lewis (1946), dealing with this problem, concluded that mental disorders of the elderly would be responsible within the next thirty years for the bulk of patients admitted to mental hospitals. The present study is a further examination of this problem, and adds to those of Gallinek (1948) and of Roth and Morrissey (1952), who have pointed out that affective disorders are far commoner in old age than was previously supposed, are distinguishable from states due to organic senile change, are treatable, and carry a good prognosis. We are here concerned with the recognition of such states, the results of treatment, and the length of hospitalization required as compared with organic senile states.

Material and Method

In 1951, 119 patients aged 65 or over (see Table I) were admitted to Crichton Royal; 12 of these had had previous admissions. This is the material of the present study. Cases have been assigned to three major diagnostic groups (senile dementia, cerebral arteriosclerosis, and affective disorder) and three minor diagnostic groups (schizophrenia, delirious states, and mixed conditions). The diagnostic grouping of patients who had died or had been discharged when this study was begun was decided from perusal of the case records. All cases were followed up at six, twelve, and twenty-four months after admission. Those still in hospital, or readmitted, were personally interviewed. Those discharged were followed up through correspondence with the family doctor and relatives, through hospital reports, or from a social worker's visit. The clinical state was classified under the following headings: (1) dead; (2) still in hospital; (3) home, but invalided; and (4) home, with social recovery—that is, resumption of previous life and occupation. Sex seemed to have no significant effect on the clinical outcome, and no sex differential is therefore made in the follow-up tables.

Diagnostic Findings

The most important finding was that differentiation of the affective disorders from the organic psychoses presented little difficulty on the whole.

Major Group

Affective Disorder.—In 32 out of the 33 cases this was a depressive syndrome, usually with agitation and presenting with delusions of guilt and unworthiness, paranoid ideas in tune with the mood, loss of appetite and sleep, with such hypochondriacal complaints as numbness and tension in the head. There had been no evidence of mental abnormality before the depression, and intellectual functions were retained. Although recent memory often appeared defective, this was attributable to morbid preoccupations which interfered with the attention, and memory became normal with clinical improvement. Orientation was correct, except in two patients who showed mild confusion. In only two cases had habits deteriorated. The onset of illness had been fairly definite, and was commonly associated with psychological or physical trauma. Its duration before admission had varied from two weeks to one year, with an average of eighteen weeks. A family history of depression was frequent, and five patients had attempted suicide before admission. Of the 33 cases, 25 were in their first admission, and 8 had been previously admitted before the age of 65.

Senile Dementia (51 cases).—These presented a different picture, characterized by intellectual deterioration and confusion, and disorganization of the personality, nocturnal restlessness and wandering, and some delirium at one time or another in most cases. The typical affect was a shallow euphoria occasionally disturbed by irritability or rage. Delusions were frequent but unrelated to the mood, and were transient and variable, in line with the confusion. Onset of illness could not be accurately defined: there had been a drift from senescence to psychosis; but, so far as duration could be gauged, this was much longer than in affective cases—averaging three years, varying from two months to six years. Intellectual functions were not retained, grasp and recent memory were impaired, while confabulation was frequent. On testing, Goldstein's (1952) catastrophic reaction was frequently seen—a rapid change from good humour and co-operation to opposition, agitation, and tears. Orientation was impaired, habits had often deteriorated. No suicidal attempts had occurred, and this finding is in line with those of Batchelor and Napier (1953), who concluded that in elderly people a clear-cut depressive state comprises the setting in which the majority of suicidal attempts occur (80% in their series).

Cerebral Arteriosclerosis (13 cases).—As these cases carry better prospects of remission than those of senile dementia and can often be differentiated therefrom on Rothschild's (1947) criteria, an attempt at differentiation was made, notwithstanding the view of Robertson and Browne (1953) that such differentiation is possible only on necropsy. To reduce the possible error, cases are diagnosed as arteriosclerosis only when there is also an unmistakable history of cerebro-vascular accident. The clinical picture resembles that of the senile dementia group in the prominence of intellectual deterioration, with shallow euphoria accompanied by emotional lability, but differs from it in its fluctuating course, relative preservation of the personality and insight, and a history of cerebro-vascular accident.

Diagnostic Error

Among the 33 affective, 51 senile dementia, and 13 arteriosclerotic cases, in three cases the diagnosis presented some difficulty because of the simultaneous appearance of both organic and marked affective features. One case of cerebral arteriosclerosis did present with depression and hypochondriasis, but showed unmistakable intellectual impairment as well as a history of cerebro-vascular accident. Two patients, later realized to be cases of affective disorder, were admitted in delirium. One had been ill for only three weeks, had been admitted once for depression eight years before, and on this occasion, despite the "organic" features, showed obvious affective components. In the other, the delirium was associated with agitated depression that involved delusions of guilt and unworthiness together with a suicidal attempt. Both cases responded to electrical treatment and recovered; there was no intellectual impairment.

A further point indicating the small margin of error (stressed by Roth and Morrissey, 1952) in differentiating affective from organic cases is that, of those originally admitted as suffering from affective disorder and still remaining in hospital two years later, none showed evidence of intellectual deterioration on recent testing.*

Minor Groups

The above three major groups made up the bulk of our cases—97 out of 119. The remaining 22 cases were those classified under the headings of schizophrenia, delirium (not simply an upset in the course of a senile or arteriosclerotic illness), and a third small mixed group.

Schizophrenia (5 cases).—These were of paranoid type with well-preserved intellect, passivity feelings, and hallucinations in clear consciousness.

Essential Delirium (11 cases).—This group comprised two associated with uraemia, four with cardiac failure, two with alcoholism, and three with other toxic conditions.

Mixed Group.—This was composed of one case each of alcoholic dementia, chronic hypochondriasis, obsessive compulsive neurosis, dementia paralytica, and anxiety state, together with a senescent patient admitted voluntarily because she had nobody to look after her.

Results of Follow-up

Table I shows the division of case material according to age and sex on admission. On follow-up, one of the 119 cases could not be traced. This patient had cerebral arteriosclerosis, was a home invalid six months after discharge, and was thereafter presumed to be dead.

The three minor diagnostic groups are of less importance and are only briefly summarized. Of the delirious group, at the end of two years five had died, five had been discharged—of whom four were recovered and one was a home invalid—and the remaining patient had recovered but was detained in hospital only because of home difficulties. The recovered cases included two of cardiac delirium, one of alcoholic delirium, and two of delirium secondary to sepsis.

Of the schizophrenic group, all five patients were alive at the end of two years—four in hospital and one a home invalid.

Of the mixed group, all six were alive at the end of two years, two of them still in hospital.

The outcome of the three main diagnostic groups is shown in Table II. The differences between them are very great.

Six Months After Admission.—Of the affective group, 4 (12%) had died, 11 (33%) were still in hospital, and 18 (55%) were living at home, recovered. Of the senile dementia group, 28 (55%) had died, 21 (41%) were still in hospital, and 2 (4%) were at home and invalided. Of the arteriosclerotic group, 4 (31%) had died, 7 (54%) were still in hospital, and 2 (15%) were at home invalided.

These trends were maintained, so *that at two years after admission* we find that of the affective group 9 (27%) had died, 7 (21%) were still in hospital, and 17 (52%) were living at home recovered; of the senile dementia group, 38 (75%) had died, 12 (23%) were still in hospital, and 1 (2%) was an invalid at home; in the arteriosclerotic group, no change had occurred from one to two years.

The arteriosclerotic group is too small for deductions to be made, but the figures are in line with the natural history of the condition.

In the senile dementia and affective groups the difference in outcome as regards survival is statistically significant (using χ^2, $P=0.01$), and becomes more so when it is realized that in two of the affective cases the patients died from conditions unconnected with the mental state (pneumonia and coronary thrombosis) more than 12 months after discharge, while a third committed suicide in a sudden relapse, having remained at home, recovered, for 18 months. Nor can these differences in survival be accounted for on the ground that most of the affective cases were under 75 years and most of the senile dementia cases over this age (see Table II); for application of the χ^2 formula shows that the difference in survival is significant both above and below the 75-year age level ($P=0.05$ and 0.02 respectively).

Effect of Treatment

In all, 31 patients received electrical treatment. Of these, 26 belonged to the affective group, of whom 21 were

*Tests used include Rorschach, coloured matrices, Mill Hill vocabulary, Koh's blocks, and visual gestalt.

TABLE I.—*Diagnosis on Admission*

Age	Senile Dementia		Cerebral Arteriosclerosis		Affective Disorder		Schizophrenia		Delirious States		Mixed		Total
	M	F	M	F	M	F	M	F	M	F	M	F	
65–69	2	1	2	1	3	13	1	1	2	2	2	2	32
70–74	3	4	1	2	3	9	1	1	2	1	—	—	27
75–79	10	9	1	3	1	3	—	—	2	1	—	1	31
80–84	7	10	—	2	—	1	—	1	1	—	—	1	23
85–89	1	4	1	—	—	—	—	—	—	—	—	—	6

TABLE II.—*Analysis of Results*

		Six Months				Twelve Months				Two Years				Total
		Social Recovery	Home Invalid	In Hospital	Dead	Social Recovery	Home Invalid	In Hospital	Dead	Social Recovery	Home Invalid	In Hospital	Dead	
Senile dementia	65–74			5	5		1	4	5			4	6	10
	75+		2	16	23		2	11	28		1	8	32	41
	Total		2	21	28		3	15	33		1	12	38	51
Cerebral arteriosclerosis	65–74		2	2	2		1	2	3		1	2	3	7
	75+			5	2			3	4			3	4	
	Total		2	7	4		1	5	7		1	5	7	13
Affective disorder	65–74	15		11	2	16		8	4	15		6	7	28
	75+	3			2	3			2	2		1	2	5
	Total	18		11	4	19		8	6	17		7	9	33

discharged recovered. On the average, six treatments were required, but five cases needed more than one course. Two treatments a week seemed the most desirable frequency. The average period of hospitalization was 12 weeks.

Two patients died in hospital, one of cerebral haemorrhage, which might possibly have been related to the treatment. The other three remained in hospital, but with maintenance treatment led a comparatively full life. Recent psychometric testing showed no evidence of intellectual deterioration, despite repeated treatment.

Of the 21 affective patients discharged, 11 maintained a complete social recovery, 5 relapsed—of whom 3 again recovered following treatment and were still well at the end of two years—while 2 had to stay in hospital after readmission.

Of the seven affective cases which did not receive electrical treatment, four were thought to be too frail and three too mildly ill to need it. Of the frail cases, one died of cardiovascular degeneration, two remained in hospital, and one recovered and was discharged after 14 months. Of the mild cases, all recovered, and, though one died of intercurrent illness after discharge, the others were still well at the two-year stage.

Apart from the affective cases, five others received electrical treatment. Two were cases of senile dementia and were unchanged, one was a case of paraphrenia, the other two were treated for an affective accompaniment (manic and depressive respectively) of dementia paralytica and of obsessive compulsive neurosis.

Discussion

The present material was restricted to patients of 65 years of age and over. This age, the usual time for retirement and pension, seemed an appropriate point from which to discuss mental diseases of the aged.

An examination of the figures shows that affective disorder of old age and senile dementia are two very different clinical entities. The one seems to have a fair prognosis and holds promise of recovery in a high percentage of cases; the other leads in most cases to a downhill course and fatal termination. Cerebral arteriosclerosis, although leading to the same fate eventually, is a more protracted illness, requiring longer hospitalization.

What is the practical application of this distinction? In this material, senile and arteriosclerotic cases comprised 64 (55%) of the 119 cases. Whether this proportion has any general application it is difficult to say. It certainly contrasts with the finding of Camargo and Preston (1945) that in 683 American patients of the same age group the senile and arteriosclerotic cases totalled 85%. Other estimates in this country have been 36% (Roth and Morrissey, 1952), and for cases over 60, 34% (Robertson and Browne, 1953) and 63% (Post, 1951). Post also quotes Clow's figure of 35.1%.

The evidence indicates that in this country at any rate, even in the older material, senile dementia and cerebral arteriosclerosis cannot account for much more than half the cases (in this study 53%). This is important in view of their very poor prognosis. Thus the death rate in our cases of senile dementia rose from 55% after six months to 75% after two years. Roth and Morrissey found 53% deaths after six months and 78% after two and a half to three years. Camargo and Preston found 70.7% after three years.

Similar considerations applied to the arteriosclerotic cases even though their immediate prospects of remission and discharge are better, as Post (1944) has shown. Our own group, diagnosed on very strict criteria, showed 5 deaths out of 13 cases after two years.

Further, although there were no cases of neoplasm among the cases presented here, it must not be forgotten that the risk of brain tumour increases with age, and the differentiation from other organic states may be difficult, for the reasons listed by Allison (1952).

The important differential diagnosis in elderly psychiatric patients, however, is between affective disorder and organic states, since the former carries a good prognosis when identified and treated. If undiagnosed, death by suicide or from the increased liability to intercurrent infection may well ensue. But the value of electrical treatment is beyond question; nor is it as hazardous for the old as was formerly believed, especially since the introduction of relaxants. Thus Evans (1943), Mayer-Gross (1945), Feldman *et al.* (1946), and Wilbur and Fortes (1947) have all reported the satisfactory treatment by this means of patients in the seventh and eighth decades. Kino and Thorpe (1946) found that in 300 melancholics of all ages given electrical treatment the best results were among those patients over 60. Gallinek (1948) successfully treated a patient of 84. One of the present cases was 82 and recovered. A large percentage of these patients had one or other of the physical complications of old age—various grades of cardiovascular defect, hypertension, osteoarthritis, hernia, etc. All these authors stressed the facts confirmed by this study—the safety of the treatment despite the organic difficulties of old age, the resultant shorter stay in hospital, and the higher recovery rate.

Summary

119 patients aged 65 and over, being the unselected admissions to a mental hospital during one year, were followed up at intervals of six months, twelve months, and two years.

Only slightly more than half of the cases belonged to the senile dementia and arteriosclerotic groups and had a relatively poor outcome. Between one-quarter and one-third were cases of affective disorder, and were found to be clinically distinguishable from cases associated with senile or arteriosclerotic cerebral disease. Affective disorder was found to be a benign illness in contrast to the senile dementia and arteriosclerotic groups.

The results of electrical treatment in 26 of the 33 cases of affective disorder proved satisfactory.

It is concluded that in patients of this age group every effort must be made to differentiate the affective cases from cases of senile dementia and cerebral arteriosclerosis. If the physical condition of the patient permits, electrical treatment should be considered. Age as such is no barrier to the use of this treatment, and even when the physical condition is not perfect the risks of treatment must be balanced against the misery of a protracted illness.

I am indebted to Dr. P. K. McCowan for allowing me facilities to carry out this work and for his continued encouragement, and to Dr. W. Mayer-Gross and Dr. M. Partridge for their most helpful criticisms. Statistical calculations and psychometric testing were carried out by Mr. Joseph Kelly and Mr. John Orme, to both of whom I wish to express my thanks. I also wish to acknowledge the suggestion of the Geriatric Subcommittee of the Clinical and Research Section of the Royal Medico-Psychological Association, at whose instigation this work was undertaken.

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Medical Memoranda

Spontaneous Rupture of the Spleen

A case of spontaneous rupture of the spleen complicating localized perforation of a gastric ulcer is here reported. No previous case has been found in the literature.

Case Report

A man aged 74 was admitted on November 18, 1952. Eleven hours previously he had been seized with sudden severe pain in the left upper abdomen. This quickly spread all over the abdomen and was accompanied by pain in the tip of the left shoulder, weakness, and a "giddy feeling." There was no vomiting. He completely denied any injury, fall, or unusual occurrence. He had had indigestion, rather suggestive of ulcer, for many years, and also bronchitis.

On examination he resented movement and was obviously in pain. His pulse was 80, of good volume; blood pressure 170/90; no appreciable cardiac disease. Moist sounds were heard at base of left lung. The abdomen was generally tender with rigidity but more especially in the upper half. Bowel sounds were present. There was no reduction of liver dullness. He had slight tenderness per rectum.

He was regarded as a case of perforated ulcer, but if the history had given reasonable excuse in the way of trauma he would have fitted the picture of ruptured spleen.

Operation.—The abdomen was found to be full of blood and a mass of clot was present under the left diaphragm. On removal of the clots, a thickening was felt in the greater curvature of the stomach, opposite the spleen, which was large, soft, and ruptured. It was found that a large subcapsular haematoma had completely separated the spleen from its capsule, and both were ruptured. On splenectomy, clot was noticed in the veins only. The gastric lesion was an ulcer with thickening just over 1 in. (2.5 cm.) diameter, and a perforation was seen in a wad of omentum adherent to it. The whole area was inflamed and friable, and the appearances suggested that the perforation had been walled off by the omentum and the area of the splenic hilum. The perforation was confirmed by forceps passing direct into the stomach through it. Simple closure was performed. There were no glands, the liver was clear, and the ulcer was not obviously malignant. The abdomen was closed with drainage.

He received 3 pints (1.7 litres) of blood, and progressed very satisfactorily apart from a resuture of the wound on November 29. A blood count on November 19 showed: W.B.C., 35,000 (86% polymorphs)—simple hypochromic anaemia. Later counts still showed no evidence of specific dyscrasia in the peripheral blood. A barium meal on December 31 showed an ulcer crater high up on the greater curvature of the stomach.

The pathologist reported that no specific splenic disease was present, but there was general congestion and two veins were partially occluded by thrombus. The patient was discharged home on January 12, 1953, symptom-free, and has remained so on an ulcer diet. A barium meal on June 5 showed no evidence of the ulcer.

Comment

There is insufficient pathological evidence from the specimen to assess the time interval between the perforation and the splenic rupture. The sequence of events would appear to have been: (1) perforation of the ulcer with immediate walling off by omentum in the region of the hilum of the spleen; (2) local inflammation and thrombosis of the splenic veins with swelling and congestion, leading to a subcapsular haematoma; (3) rupture of the subcapsular haematoma, probably by twisting or some other trivial injury, marking the onset of the clinical picture. On further inquiry after recovery the patient stated that shortly before the onset he had assisted his invalid wife to move and change her position, as he had previously had to do on many occasions, but he did not attach any significance to this himself.

It is probable that the onset of the majority of spontaneous splenic ruptures is due to slight or unnoticed injury, trivial, yet effective enough on a spleen which is enlarged, soft, or otherwise rendered susceptible by disease. Coughing and vomiting (Moore and Chapman, 1951), sneezing, twisting, lifting, diarrhoea, defaecation, etc., as quoted by Hershey and Lubitz (1948), have been regarded as sufficient trauma. In some reported cases of spontaneous rupture of the normal spleen, ruptured subcapsular haematomata were found. It seems likely here that the liability to very easy ("spontaneous") rupture has been produced by the presence of a silent subcapsular haematoma from some previous cause. In malarial cases of spontaneous rupture, very trivial injury acting on a silent subcapsular haematoma has been regarded as not uncommon (Hershey and Lubitz, 1948).

Spontaneous rupture of the spleen is difficult to diagnose, and even the broader diagnosis of internal haemorrhage is by no means usually made. The analysis by Hershey and Lubitz (1948) of 65 published cases with a malarial basis shows that the diagnosis was made only eight times and was suggested in two others. The evidence of internal haemorrhage in the clinical picture may vary from nil to gross. Pain in the tip of the shoulder in an acute case should arouse strong suspicion of blood in the peritoneal cavity. This sign was present in all of three recent cases of ruptured spleen that I have encountered, but unfortunately it is not at all a constant sign. Zabinski and Harkins (1943) reported it occurring in only 19 out of 68 cases of ruptured spleen, and Hershey and Lubitz (1948) as present in only 6 of 65 cases. Ballance's sign, allegedly specific for rupture of the spleen, was reported in only one of these 65 cases.

I wish to thank Mr. John Talbot for the opportunity of dealing with this case.

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Rupture of the Splenic Artery Complicating Pregnancy

Aneurysm of the splenic artery is not unduly rare. In 1942 Sherlock and Learmonth collected 125 cases, and in 1947 Cosgrove, Watts, and Kaump stated that approximately 144 cases had been described. They pointed out that in the younger age groups females outnumbered males. It is not surprising, therefore, that the condition should occasionally be associated with pregnancy. Cases in which such an association occurred have been recorded fairly often, and Chalmers (1949) gives an excellent review of the subject. He points out that only two cases are recorded as having survived—namely, those of MacLeod and Maurice (1940) and of Gillam (1942). Chalmers states that the prognosis is poor because unawareness of the condition leads to difficulties in diagnosis and delay in treatment.

In some of the cases mentioned above no aneurysm was demonstrated although the artery had ruptured. Gillam (1948) states: "It seems probable that the splenic artery is liable to have weak spots, perhaps congenital in origin, where rupture with or without previous aneurysm formation is prone to occur."

The case presented below, in which no aneurysm was present, is reported in response to Chalmers's (1949) appeal that all cases should be recorded, to bring the condition to the notice of the profession.

Case History

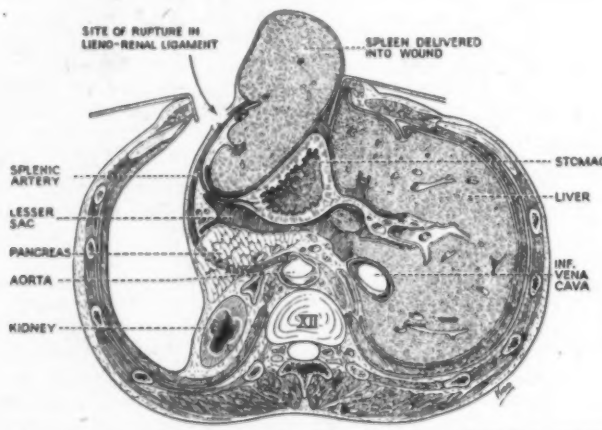
The patient, a healthy young woman aged 32, was 20 weeks pregnant and had attended her doctor for routine antenatal examinations, at which nothing abnormal was found.

On Christmas Day, 1949, when dusting a picture, she was literally struck down with sudden intense pain in the left hypochondrium. She managed to telephone a neighbour, who helped her to bed. She had another severe attack of pain, vomited once, had a large bowel movement, and lost consciousness for a few minutes. Her pulse was not palpable, blood pressure was not recordable, and the heart rate was extremely slow. She was tender in the left hypochondrium, the uterus was soft and not tender, and there was no sign of external bleeding. Nikethamide was given, and she improved very considerably, the systolic pressure rising to 70 mm. Hg, but the heart rate remained slow at 80 a minute. No abnormality was detected in the heart, lungs, or nervous system.

The pulse rate rose to 130 a minute and a definite fullness became palpable below the left costal margin, the uterus remaining soft and painless. A definite diagnosis of bleeding from the spleen or its pedicle was made.

She was removed to hospital, and as soon as a blood transfusion was running satisfactorily operation was begun although the blood pressure was not recordable.

The abdomen was opened through an upper left rectus-splitting incision. The general peritoneal cavity contained a large quantity of liquid and clotted blood. The spleen was elevated and the lieno-renal ligament was felt to tear as the spleen was delivered into the wound. The ligament and the tail of the pancreas were deeply blood-stained, and about one inch (2.5 cm.) from the hilum the splenic artery was bleeding briskly from a lateral defect (see illustration).



Schematic cross-section showing site of rupture into the general peritoneal cavity.

The vessel was clamped proximally, and as bleeding continued, but with diminished vigour, it was also clamped distal to the bleeding-point. There was now an interval to allow the transfusion to overtake blood loss. Splenectomy was rapidly performed, the lesser sac was opened to confirm the absence of blood, and the abdomen was closed with stab drainage to the loin. At the end of the operation the systolic pressure was 70 mm. Hg.

On the 11th day she was spontaneously delivered of a macerated male infant. She was discharged on the 17th day, after an uninterrupted convalescence.

Post-operative blood examination revealed no abnormality in red or white cells, and the Paul–Bunnell reaction was negative. The spleen, which was about twice normal size, was histologically examined, and the only abnormality found was venous congestion.

The patient has remained well, and in 1952 had a normal pregnancy.

Discussion

The initial bradycardia in association with low blood pressure made diagnosis difficult at the outset, but the ensuing tachycardia and the abdominal findings made the diagnosis of haemorrhage from the spleen or its pedicle reasonably certain. Before the onset of tachycardia the help of a medical colleague, Dr. R. A. Pyper, was obtained in order to exclude coronary thrombosis.

No aneurysm was present, and the site of rupture was not examined histologically. To have removed it would have prolonged the operation and might have damaged the pancreas. The presence or absence of an aneurysm would seem to depend on the degree of weakness in the wall of the artery, and no useful purpose would be served by differentiating between cases with and without an aneurysm.

Primary rupture into the general peritoneal cavity is very unusual and has not previously been reported. The usual sequence of events, according to Sherlock and Learmonth (1942), who studied 125 cases (14 in pregnancy) in which rupture had occurred in 56, is for a retroperitoneal false aneurysm to form. This later ruptures into the lesser sac. The fact that primary rupture, in this case, was into the general peritoneum probably made the diagnosis easier than in previously recorded cases.

Rupture has hitherto been reported only as a complication of the later months of pregnancy, and concealed accidental haemorrhage has frequently been diagnosed and the rupture discovered at operation or necropsy. The severe shock, the death of the foetus, and the tender and possibly rigid abdomen must make such a diagnosis almost inevitable.

Chalmers (1949) states that when the condition occurs "in a pregnancy of over four months' duration the uterus must be emptied first, to facilitate the approach to the bleeding vessel." In the present case a 20-weeks pregnancy did not interfere in the slightest with the operative manipulations.

Ligation of the artery on both sides of the rupture would almost certainly have sufficed in the present case, but splenectomy presented no difficulty and ligation was not considered. Chalmers (1949) and Lennie and Sheehan (1942) state that after the vessel is ligated the spleen may be left to undergo aseptic atrophy. The occurrence of subsequent atrophy would depend on the site of the ligatures. In the present case the spleen would have received a good blood supply through the gastric branches. Aird (1946) describes a case of severe bleeding from a splenic artery eroded by a peptic ulcer. The splenic artery was ligated, and even after a subsequent gastrectomy there were no signs of splenic infarction.

Summary

A case of spontaneous rupture of the splenic artery occurring in pregnancy is described.

The primary rupture was into the general peritoneal cavity. This contributed to the patient's recovery because diagnosis was not delayed and treatment was instituted immediately.

Although the uterus was enlarged to 20 weeks' pregnancy there was no necessity to empty it before attacking the bleeding-point.

Ligation of the splenic artery proximal to its gastric branches will not result in infarction of the spleen.

We gladly acknowledge our indebtedness to Dr. W. Bingham for the anaesthesia and for resuscitation of the patient; Dr. R. A. Pyper, who saw the patient soon after the onset of symptoms and confirmed the absence of coronary disease; and to Dr. W. Vint for the histological examination of the spleen. One of us (H. W. G.) is indebted to Mr. W. W. Bassett for the opportunity of treating this patient in Lurgan and Portadown Hospital.

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Reviews

CYTOLOGICAL DIAGNOSIS

Atlas of Exfoliative Cytology. By George N. Papanicolaou, M.D., Ph.D. (Pp. 236; illustrated. £7 4s.) Cambridge, Mass.: Harvard University Press. London: Oxford University Press. 1954.

George Papanicolaou has for more than 40 years been studying the minute structure of cells exfoliated from epithelium-lined surfaces. His observations very greatly clarified the analysis of the normal sex cycle in mammals and in the human female, and led to significant advances in sex physiology and endocrinology. He successfully applied the same technique to gynaecological disease, and against this background of unique and highly specialized experience he satisfied himself more than ten years ago that in carcinoma of the cervix, and more significantly in its early latent stages, the vaginal secretion contains exfoliated cells and cellular masses whose origin from a malignant neoplasm can frequently be deduced with certainty. The observations leading to this conclusion were carefully controlled against the clinical outcome and the histological structure of the tumour when these became available.

Papanicolaou then became the leader of a rapidly increasing number of enthusiasts who applied his methods in the diagnosis of suspected malignant disease, using for this purpose such material as urine, prostatic secretion, semen, and sputum; bronchial, gastric, duodenal, rectal, and colonic aspirates and washings; pleural, peritoneal, and pericardial exudates; breast secretion; and the fluids aspirated from other body cavities and cystic growths. It is claimed that cytological diagnosis has been employed most successfully in cancer of the uterus, lung, bladder, rectum, and stomach, and of the pleural and peritoneal linings.

The book is described as an "Atlas," a title which tempts the reader to examine the plates and neglect the text. If he does this and has had little practical experience of the criteria of diagnostic cytology it is likely that he will be repelled by its difficulties. We would therefore suggest that the account of the general criteria of malignancy in the text (pp. 14 to 21) be read before the plates are critically examined.

The *Atlas* has great artistic merit. There are 36 plates, 24 of which are the work of Hashime Murayama and are beautifully executed. They were originally drawn at a magnification of 1,050 diameters and are reproduced at 525 diameters. Twelve of the plates are composed of colour photomicrographs in which the colour rendering is almost perfect. These are at a magnification of 600 to 1,000 diameters. One of the disadvantages of diagnostic cytology is that it needs a long period of training, during which an atlas of this type becomes a necessity, and one of the important criteria used in cellular diagnosis is the relative size of the suspected cells and their nuclei as compared with the normal. It is unfortunate, therefore, that there should be this degree of variation in magnification in the two series of plates, and also that different magnifications are sometimes used for the figures in the same plate. While the artistic standard of the drawings is very high, the photomicrographs are more realistic in their resemblance to the cells of a stained film and are likely to be of more service in the practice of this modern diagnostic device.

The author has very clear views regarding the limitations of cytology in diagnosis. "It is realized," he says, that "errors resulting from misinterpretations of cytologic findings are to be expected in a field which is still in its infancy," and that "the general and diagnostic significance of many exfoliated cells is still incompletely understood." On the other hand, he reminds us that "the cytologic characteristics of cancer cells are often striking, capturing one's attention immediately by their contrast to those of non-malignant forms"; and he believes that "by further progress, exfoliative cytology may finally reach the status of a more exact science, approaching the accuracy of histopathology in the recognition of various malignant tumours."

This handsome volume will receive a warm welcome from those who use cytology in the diagnosis of malignant disease, are convinced of its value, and appreciate its limitations. It will decide the issue one way or the other in the minds of those who have healthy doubts of the value of this rather arduous discipline. It should be critically examined by all who, without submitting diagnostic cytology to a fair trial, are unreasonably hostile to its claims.

GEOFFREY HADFIELD.

BACTERIAL PHYSIOLOGY

An Introduction to Bacterial Physiology. By E. L. Oginsky and W. W. Umbreit. Drawings by Evan L. Gillespie. (Pp. 404+xi; illustrated. $6 or 51s.) San Francisco: W. H. Freeman and Co. London: Bailey Bros. and Swinfen Ltd. 1954.

Micro-organisms have of recent years become the subject of study by biochemists, biophysicists, geneticists, and microbiologists. Many workers have been initially attracted by bacteria in particular, since they are comparatively easy to grow and the rapidity of their growth enables studies of variation and mutation to be undertaken as short-term projects; such initial attraction has frequently led the workers into an absorbed study of microbial existence. As a result a great body of knowledge concerning the life of bacteria has accumulated, and the time is ripe for an organized and collected account of the subject. Such an account is provided by the present volume, wherein much can be learned, not only about bacteria, but also about the processes of life in general and about the particular interactions of unicellular creatures with their environment.

The authors define bacterial physiology as knowledge of "what happens in bacteria, how it happens, and why it happens," and in developing this theme their text provides excellent summaries of such matters as the structure of the bacterial cell, its metabolism, its interaction with and effects on its environment, factors controlling its growth, and the nature of its survival mechanisms and virulence in a host. In general the factual material is admirably up to date, and controversial matters are either avoided or discussed with suitable caution. The book is designed as an introductory text, and as such includes chapters on enzymes, energy, and genetics, but these are well done and their presentation will be useful for those who have not studied these matters elsewhere. The text is illustrated by many schemes and figures, some of which are unnecessarily elementary and mechanical. The material as a whole has been collected, correlated, and integrated into a study of bacterial physiology which can be recommended both as an introduction to students in microbiology or biochemistry and as an interesting survey of the present position for those whose daily activities are concerned with the consequences of bacterial existence.

E. F. GALE.

THE MARCH OF MEDICINE

Medical Progress, 1954. Edited by Morris Fishbein, M.D. A review of medical advances during 1953. (Pp. 345+x. 36s.) London: J. and A. Churchill, Ltd. 1954.

Annual Review of Medicine. Edited by Windsor C. Cutting, M.D., and Henry W. Newman, M.D. Volume 5, 1954. (Pp. 490+ix. $7.) Stanford, California: Annual Reviews Inc. 1954.

Although these two books cover much the same ground, they differ greatly in approach and treatment. Both use the word "medicine" in the sense of great medicine, including surgery and dentistry. *Medical Progress* contains twenty chapters, written by different authorities under such broad titles as cardiology, nutrition, surgery, and gynaecology. The method adopted is to abstract and summarize recent literature with special emphasis on the practical and therapeutic aspects. There are separate sections on psychiatry, medical psychology, rehabilitation, and physical medicine. The emphasis on psychosomatic medicine is noteworthy, and it is admitted that "some have nearly reached the point

of view that all illness is psychogenic and that its physical components are merely coincidental." *Medical Progress* is the same type of book as the *Medical Annual* and the *Year Books*, but it seems unlikely to displace them in popularity.

The *Annual Review of Medicine* belongs to a series which also covers psychology, physiology, biochemistry, and other branches of the natural sciences, and its approach is much more academic and intellectual. Again there are twenty chapters by different authorities, but the tendency is to invite different experts each year to take a particular aspect of the subject and write a review or essay. For example, the chapter on diseases of the reticulo-endothelial system and haematology by Stefanini and Dameshek is subtitled "A Review of Selected Aspects of the Haemorrhagic Disorders." The chapter on diseases of the respiratory system is a highly technical article on circulation through the lung and diffusion of gases, with a good deal of physics and mathematics. The *Annual Review* is, in fact, addressed to the medical specialist and the clinical research worker rather than to the general reader. An extremely useful chapter is the last one, which is in the form of an annotated list of reviews in medicine and includes some 500 titles.

The book is extremely well edited, with a detailed author index and subject index, and is a mine of information.

L. J. WITTS.

PROBLEMS OF OLD AGE

Living Longer. A series of lectures organized by the Institute of Public Administration with the co-operation of the University College of the South-West and the National Council of Social Service. (Pp. 72. 3s. 6d.) London: The National Council of Social Service. 1954.

Living Longer—some aspects of the problems of old age—is a very readable book and an interesting introduction to students. The book is well balanced between the factual and the philosophic and introduces all the more important aspects of the subject. It is thoughtfully prepared by a number of leading authorities and contains much of good sense, wisdom, and ethics; and while giving some practical advice it also points the way to "fresh thinking" on "what is known as the problem of the nation's old people." It contains some delightful quotations and many references to the classics which greatly enrich the reading.

As a symposium of a number of papers by different authors it is not unreasonable that there is a certain repetition of ideas, but in these circumstances such repetition merely serves to emphasize the importance of certain fundamental principles. For instance, that loneliness and unwantedness are responsible for so much unhappiness and ill-health amongst older people cannot be said too often, and each contributor has brought his own reflections and remedies to the attention of the reader. Each section emphasizes the importance and need for continued employment and for adapting an environment to an old person rather than trying to change the individual. The section "Light Work for the Old" describes pioneer work and is a most important addition to the complex subject of continued employment of old people, and, while no solution is offered, some very constructive ideas are put forward.

There is a wealth of factual information given, and more that is briefly referred to in the different sections, which will enable the interested reader and the student to pursue his studies into much broader fields, and the references to authors include many disciplines of thought.

MARJORY WARREN.

POISONING AND POISONERS

The Power of Poison. By John Glaister. (Pp. 272; 6 figures. 18s.) London: Christopher Johnson. 1954.

This book by Professor Glaister deals with poisoning from various viewpoints rather than with particular cases. The actual cases discussed are mostly quite well known and have all, except the last two, been the subject of more or less intense treatment by earlier writers. The author, however, takes them from a different angle and uses them to illustrate points which he desires to make in connexion with the legal aspects of toxicology: the laws of supply and safety measures; the general investigation of poisoning cases; and the personality of certain poisoners.

There are necessarily many references to the same cases under the different headings, but on the whole Professor Glaister has produced a readable and interesting book. It breaks no new ground concerning the scientific aspects of toxicology or investigation, but that, I think, was the intention of the author. It will no doubt also prove interesting to non-medical readers and to the general public, who seem to cherish an odd affection for those malefactors who prey upon them. Most modern cases of poisoning are quite devoid of romantic features, and there is little of that subtlety which we associate with the efforts of Medea, of Locusta (Nero's adviser and collaborator), of Toffania or other members of the Roman and Venetian schools of toxicology. Possibly, of course, time operates and we see those ancient murderers through rose-tinted spectacles. Professor Glaister, no doubt wisely, does not attempt to dramatize, but makes the point that poisoners are in general a sordid and miserable lot. The book is well printed and pleasantly presented.

SYDNEY SMITH.

THE ARMSTRONGS OF CASTLETON

George and John Armstrong of Castleton. By William J. Maloney, M.D., LL.D., F.R.S.Ed. (Pp. 116+xii; illustrated. 17s. 6d.) Edinburgh and London: E. and S. Livingstone Ltd. 1954.

John and George Armstrong were sons of the manse at Castleton in the Presbytery of Jedburgh. Their father, Robert Armstrong, stinted himself so that his sons might have a good education in Edinburgh. Both studied medicine and came to London to practise, though they were neither of them sanctioned by the College of Physicians. John Armstrong (1709–1779) had a literary bent which qualified him for inclusion in the *Dictionary of National Biography*, though Dr. Maloney shows up some inaccuracies in the account there given. George Armstrong (1719–1789) is little known, but deserves to be remembered as a pioneer in the study of children's diseases. At a time when little was known and less was cared about the ailments of infants he founded a dispensary which, according to Still, "was the most important step ever taken in this country towards the care of sick children." Though the scheme was supported by several prominent physicians and lay persons, most of the expenses of maintaining the dispensary fell upon its founder, and it is sad to relate that after with great difficulty keeping the place going for 12 years he was imprisoned for debt, died in poverty, and was buried no one knows where.

In this well-produced book Dr. Maloney has given us the first authoritative life of this enterprising man, and paediatricians everywhere will read it with feelings of horror at the neglect of children in those days, and with admiration for the man who gave the best part of his life and more than he could spare of his money to help the children.

Dr. Maloney unfortunately did not live to see his book through the press, but Mr. F. N. L. Poynter has very carefully edited it, and the result is all that could be desired.

ZACHARY COPE.

PARTIAL DENTURES

Partial Dentures. By John Osborne, Ph.D., M.D.S., F.D.S., and George Alexander Lammie, Ph.D., B.Sc., H.D.D. (Pp. 374+vii; 205 figures. 42s.) Oxford: Blackwell Scientific Publications. 1954.

Too often in the past books on partial dentures have been concerned merely with mechanical aspects, and have consisted mainly in diagrams or pictures showing particular types of partial denture that could be used in chosen cases. This book is a welcome change, since although mechanical aspects are very adequately dealt with there is far greater emphasis on the effects of partial dentures on the tissues in the mouth. It should prove invaluable to the student, giving him a clear insight of the aims in making the partial denture, and of equal value to the practitioner. A book to be most warmly recommended.

ALEXANDER MACGREGOR.

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CARCINOGENS IN CIGARETTES

Last week an interesting communication by Cooper, Lindsey, and Walker recorded the identification of 3:4-benzpyrene in the tar of cigarette smoke.[1] This paper should be read in conjunction with three recent papers which record the preliminary steps of Cooper, Lindsey, *et al.*[2-4] to which this is a direct sequel. The experimental results, obtained by careful and thorough work, are highly important. The description of the experimental procedures and the accompanying conditions are a model of clarity and completeness.

In these papers the authors have shown the following, in order of publication. First, in cigarette smoke the polycyclic hydrocarbons, anthracene and pyrene, can be demonstrated by combined chromatography and spectrometry. Secondly, the conditions in the experiments simulated closely those of human smoking, and the temperatures encountered were those experienced in normal human smoking, being sufficiently high to account for the presence of polycyclic hydrocarbons. Thirdly, the tars from all-paper cigarettes (in which chopped cigarette paper replaced the tobacco) contain several polycyclic hydrocarbons, which have been identified, the most important being 3:4-benzpyrene. And fourthly, when sufficiently large quantities of ordinary cigarette tar were examined 3:4-benzpyrene was detectable. Thus they show that both the tobacco and the paper of cigarettes during smoking yield 3:4-benzpyrene. Their calculations imply that an individual smoking forty cigarettes daily for a year would take in 150 micrograms of this carcinogen, while during the same period he would take in another 200 micrograms from an average urban atmosphere. Arguing from the recent work of Steiner,[5] who found that benzpyrene adsorbed on to carbon black suffered considerable inactivation, the authors suggest that the benzpyrene in cigarette smoke, being dissolved in the form of a fine suspension in a solvent material, is likely to be more active than the benzpyrene of the air, which is probably adsorbed on carbon particles and therefore relatively inactive. If indeed this is so, can the relative freedom of coal-miners from lung cancer be explained in these terms—namely, that any inhaled benzpyrene is adsorbed on the particles of inhaled coal dust and so rendered relatively inactive?

It would be interesting to know at what temperature the all-paper cigarettes were smoked and how long they took to smoke. Those who have worked with similar all-paper cigarettes have found that the rate of burning is very irregular and, in general, much more rapid than that of natural cigarettes. It might well be that the temperature of combustion is different from that of ordinary cigarettes. Again, the chopped paper which replaces the tobacco will probably burn under quite different conditions of oxygenation as compared with the paper which holds it together, where the oxygen supply will be almost perfect, while the temperature attained in burning the paper inside the all-paper cigarette is almost certain to be different from that of the covering paper. Lindsey estimates that the paper alone contributes 0.05 microgram of benzpyrene to the total of 1 microgram from 100 cigarettes, which suggests that the tobacco is by far the most important source of the benzpyrene in cigarettes. This in turn is very suggestive that all smoking—of pipes and cigars as well as cigarettes—carries a risk of the introduction of benzpyrene into the system. It perhaps explains the hesitation which Doll and Bradford Hill[6] have in freeing the pipe from criticism. Indeed, in their last paper,[7] on the deaths of medical doctors from lung cancer, they found four cases of lung cancer associated with pipe-smoking out of the 36 cases associated with smoking in all forms.

For a long time many observers have held to a suspicion that atmospheric soot, the exhaust fumes of the internal combustion engine, the dust of tarred roads, and the rubber resulting from the abrasion of vehicle tyres may, by virtue of their known content of benzpyrene, be contributing to the increased deaths from lung cancer. Many have added smoking, particularly cigarette-smoking, to this list. They now have further solid reasons for doing so. But, while there is no doubt that biologically benzpyrene is a dangerous carcinogen to man and animals, what action it has on the respiratory tract has yet to be established. Possibly the epithelium of the respiratory tract in man is as unresponsive to cigarette-smoke as is that of the mouse, for so far the exposure of this animal to exaggerated doses of cigarette smoke under different conditions has, at the hands of different

[1] *Chem. and Industry*, 1954, p. 1418.
[2] Ibid., 1953, p. 1205.
[3] *Brit. J. Cancer*, 1954, **8**, 296.
[4] *Chem. and Industry*, 1954, p. 1260.
[5] *Cancer Res.*, 1954, **14**, 103.
[6] *British Medical Journal*, 1952, **2**, 1271.
[7] Ibid., 1954, **1**, 1451.
[8] Passey, R. D., *Annual Report of the British Empire Cancer Campaign*, 1929, p. 85.
[9] Campbell, J. A., *Brit. J. exp. Path.*, 1936, **17**, 146.
[10] Lorenz, E., *et al.*, *Cancer Res.*, 1943, **3**, 123.
[11] Essenberg, J. M., *Science*, 1952, **116**, 561.
[12] *Brit. J. exp. Path.*, 1934, **15**, 287.
[13] Ibid., 1937, **18**, 215.

workers,[8-11] failed to induce lung cancer as we know it in man. Again, in a striking experiment Argyl Campbell[12 13] exposed mice for a large part of their lives to the dust of the sweepings of a tarred road without inducing lung cancer, although 63% of his mice developed skin papillomata and of these 83% developed into epitheliomata as a result of the benzpyrene in the tar. No one can truthfully claim that the dust with its covering of benzpyrene in its solvent material was inactive. Perhaps respiratory epithelium is as refractory to the polycyclic hydrocarbons as is the columnar epithelium of the digestive tract in experimental animals. The whole truth may not be known until the incidence of lung cancer in a population of non-smokers can be compared with that in a population of smokers under similar conditions.

But these four papers remain a most important contribution to our knowledge. Many have thought of the possibility that, in the process of smoking, some polycyclic hydrocarbon carrying carcinogenic properties might be formed, but it was only a guess; now it has been confirmed. This work cannot fail to make an impression on the mind of the reader—whatever his attitude to the smoking problem may be—to the effect that smoking, probably in all its forms, may carry some risk all of its own, a risk of respiratory cancer induced by carcinogenic polycyclic hydrocarbons.

OCCUPATIONAL HEALTH SERVICE

Most of the urgent medical problems in industry, such as gross injury due to dangerous industrial processes or the strain of long hours, have been largely corrected. Although scientific developments occasionally give rise to new hazards the concerted efforts of employers, factory inspectorate, industrial medical officers, scientists, and workers' representatives can generally be relied on to assist the legislature in overcoming these dangers. In fact there is a constant attempt to make industry safer and more pleasant: this is good business. The demand for an expansion of medical supervision for the worker in his place of work is not, however, so easily understood by the public, or even by the workers themselves, especially when there is in being a national health and preventive service. Certainly the case for such an expansion should be critically examined, if only because of its expense, part of which must fall on industry. Most medical men agree that an occupational health service is desirable, and in 1941 a B.M.A. committee[1] defined the type of care that the individual worker should have in his or her industrial environment. More recently the Dale Committee,[2] after an exhaustive investigation of the facts, concluded in 1951 "that there should eventually be some comprehensive provision for occupational health covering not only industrial establishments of all kinds, both large and small, but also the non-industrial occupations referred to in the report of the . . . Gowers Committee." Finally the British Medical Association has recently stated its belief that:

> "The State should assume responsibility for giving direction to the development of an occupational health service of a national character: for exercising central supervision of such a service, preferably through the Ministry of Health, with possibly delegated responsibility to other departments for day-to-day administration, and for providing, at least in part, the necessary financial resources."[3]

The difficulties of carrying these suggestions into effect are well known. There is, for instance, no definite agreement on the kind of service to be provided. Should it be curative in the sense that treatment, and in some cases elaborate treatment, is to be provided? Is the service to be an adjunct to industrial production or a method of maintaining and even improving the health of the industrial worker? There is also the question of what Government department should supervise the scheme, for at least three important ministries are involved—Pensions and National Insurance, Health, and Labour and National Service. Can an occupational health service exist by itself, or should it become an integral part of the National Health Service, with its expanding curative, preventive, and research facilities? The present industrial health service—apart from the factory inspectorate—is almost completely provided at the expense of industry, and cannot be considered independent in the way that the public health service is independent. The tendency to-day is to widen the conception of occupational health, and, as already mentioned, there are suggestions for providing a system of medical and hygienic supervision to non-industrial undertakings,[4] so that any decision to expand and rationalize the industrial health service may have repercussions on the future development of health-care schemes in offices and elsewhere. The B.M.A. believes that the time has not yet come to lay down the precise form of an occupational health service.[3]

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[1] Report of Committee on Industrial Health in Factories, 1941, British Medical Association, London.
[2] Report of a Committee of Enquiry on Industrial Health Services, 1951, H.M.S.O., London.
[3] *British Medical Journal, Supplement*, 1954, **1**, 114.
[4] Report of a Committee of Inquiry on "Health, Welfare, and Safety in Non-Industrial Employment—Hours of Employment of Juveniles," 1949, H.M.S.O., London.
[8] *J. Roy. sanit. Inst.*, 1954, **74**, 335.
[9] Eagger, A. A., ibid., 1954, **74**, 338.
[10] Ibid., 1954, **74**, 343.
[11] Ibid., 1954, **74**, 346.
[12] Laidlaw, S. I. A., and Bell, J. H., *Occupational Health—Survey of Govan Ward, Glasgow*, 1953.

Some of these unresolved problems have been well discussed in a series of reports that have appeared lately. Miss E. Schofield, a superintending inspector of factories, sets out the present legal position, as laid down in the Factory Acts.[5] The law relates to conditions of work and is concerned with the promotion of health, protection against particular hazards, and methods for dealing with adverse conditions in industry. Although factories vary much in size, all managements have certain obligations towards their employees—health and safety measures and at least the basic sanitary requirements. The factory inspectorate has always been a diligent force in improving conditions in factories. In some parts of the country efforts have been made to group factories for the purpose of organizing an industrial health service. In the Slough Trading Estate, where there are over 300 factories, large and small, employing over 30,000 workers, the Slough Industrial Health Service[6] is based on a central policlinic from which doctors and nurses can be quickly deployed to any part of the estate. *X*-ray, physiotherapy, rehabilitation, and other units have been established, and expert advice can be obtained from medical, engineering, and chemical consultants. The Slough Industrial Health Service, by setting a high standard of care for the small factory and attaching great importance to prevention and research, is a notable attempt to deal with some of the problems of industrial health. Herford,[7] an appointed factory doctor, is a whole-hearted advocate of the voluntary system of promoting industrial health, although he is fully aware of the criticisms made about the appointed factory doctor system—cursory examinations, poor organization of the work, and the lack of continuity. Hughes,[8] writing as medical officer of health, doubts that a case for an independent industrial health service has been made out. In his opinion the accident services of hospitals should be extended, the medical examinations of juveniles should be undertaken by the school health service (it is wasteful not to look after the young adult who has had expensive care at school), and medical officers of health should undertake more of the purely sanitary work, thus giving the factory inspector more time for his specialized duties.

The possibility of useful action by the health authority is well brought out in the report of a survey undertaken by the medical officer of health of Glasgow, who investigated the industrial premises and work places in an area of that city[9]: they included large engineering establishments and one-man businesses. Dr. Laidlaw clearly shows the need for an industrial health service in the area surveyed. Standards of hygiene varied, but often fell far below what is desirable. Industry is a good field for experiments in health education, and Laidlaw feels that local authorities could do much more to provide industrial medical and preventive services. Managements generally showed great interest in the survey, which was designed to supply the sort of fundamental information required before any general extension of the industrial health service is contemplated. It should not be difficult for medical officers of health to gather similar data in their areas, for much of the detail is already in their possession.

A start towards the reorganization of the occupational health service was announced last week in the House of Commons (see p. 1235) by Sir Walter Monckton, the Minister of Labour and National Service, who said that after consultations with industry and with medical and other organizations he had now "decided to take steps to stimulate the further development of industrial health services in work places covered by the Factories Act." A standing Industrial Health Advisory Committee (on which the B.M.A. among other bodies is to be represented) will be appointed to advise the Minister. Field investigations are to be carried out in order to determine the need for preventive measures or research and also to find out where the occupational health services should be extended. The Minister added:

> "The general aim will be, in close co-ordination with the preventive and curative health services provided by statutory bodies, to develop industrial health services on a voluntary basis, but I shall also consider in appropriate cases and after full consultation with the parties concerned, making use of my statutory powers under the Factory Acts."

The scope of an occupational health service is very wide. Many branches of medicine can and should make important contributions to the service—the specialist industrial medical officer, the general practitioner, the medical officer of health, and the hospitals. One of the administrative difficulties that must be faced is the necessity for medical officers in industrial practice to have security so that they can express themselves with complete freedom—only thus can a service worthy of the worker and management be provided. The Minister of Labour has now made a start towards an improved service. It remains to be seen whether the system which he is supporting—strengthened as it will be by a new administrative industrial health branch in his Ministry—will have the power and the finance to deal with the many problems that will arise. In the plans he has made for the future he has taken into account some of the recommendations in a recent memorandum[3] submitted to him by the B.M.A., particularly those relating to the necessity for regional

surveys and for experiments in providing for the health needs of industrial workers. When these investigations have been completed the time will have arrived for a decision on the form which the future occupational health service should take.

AUREOMYCIN AND TERRAMYCIN

We reported last week a statement from the Ministry of Health that aureomycin (chlortetracycline) and terramycin (oxytetracycline) are being prescribed frequently without specification of the dose. Aureomycin is supplied in capsules containing either 50 or 250 mg., and terramycin in tablets containing 50, 100, or 250 mg. A normal adult dose of either drug is 500 mg. t.d.s., and, though it may be thought advisable to exceed this in severely ill patients, it should be remembered that the larger the dose the less is the proportion of it which is absorbed. Thus there is much greater liability to gastro-intestinal disturbance to set against an only moderate increase in systemic effect. For many purposes a total daily dose of 1 g. will be found adequate. This can be divided into four doses of 250 mg., and the smaller size of the individual dose has been proved advantageous for the same reason. Dosage in children should be on a similar scale in proportion to body weight.

A statement by the Medical Research Council summarizes some useful information on these drugs.[1] They are what are now known as "broad spectrum" antibiotics, and the fact that they act against a wider range of micro-organisms than their predecessors encourages indiscriminate prescription. It was indeed suggested several years ago in the U.S.A. that they might be prescribed in any case of pneumonia regardless of its aetiology, since all the micro-organisms causing pneumonia are susceptible to them. The matter is not nearly so simple as this, and a trial of this method by an M.R.C. Subcommittee ended in a verdict that results were no better than with penicillin, and that patients much preferred the latter. The absolute indications for aureomycin and terramycin—undulant fever, psittacosis, and Q fever—are rare diseases. Aureomycin has a limited usefulness in the early stage of pertussis. Most other indications are conditional on abnormal resistance of the causative organism to penicillin (as in staphylococci) or to sulphonamides (as in dysentery bacilli or coliform bacilli in the urinary tract). The wise use of these drugs can thus be based only on laboratory findings, both as to the identity of the organism and to its individual sensitivities. There are two reasons, apart from the serious factor of cost, why it is worth while to take some trouble in deciding whether they should be prescribed or not. Extensive and indiscriminate use may not only be therapeutically fruitless, but will accelerate the emergence of resistant strains of bacteria. Staphylococci resistant to these drugs as well as to penicillin are already becoming a problem, particularly in hospitals: it can no longer be safely assumed that the newer drugs will deal with them. The second objection to unnecessary use is the occurrence of side-effects. These vary from mild nausea and diarrhoea to a fulminating staphylococcal enteritis which may be fatal. Moreover, secondary infections by resistant staphylococci or *Candida* may attack the mouth, throat, and bronchi. The most severe of these conditions, particularly that involving the bowel, seem to occur most commonly in patients after operation; the use of terramycin or aureomycin prophylactically for patients having abdominal operations may thus be inadvisable.

The third member of this group, tetracycline ("achromycin," "tetracyn") is said to be less apt to produce side-effects, whether of a milder or more serious nature. It is difficult to understand why its use should entail any less risk from secondary infection of the alimentary tract with resistant staphylococci, since there is little to choose between the three drugs in their action on this or any other organism. Nevertheless the fruits of American experience with tetracycline seem to show that it is preferable on this ground to either of its cousins, and a natural development would thus be that it should tend to replace both of them. Tetracycline is at present available in this country only under the conditions which applied to aureomycin and terramycin before November 1.

[1] *British Medical Journal*, October 23, p. 984.

BREAD FOR UNDERNOURISHED CHILDREN

Serious food shortages occurred in many parts of Europe as an aftermath of the second world war, and British dietitians were able to put to the test of direct practical experience all the theories on which the nutrition of the country had been planned during the war. It was important to find out, for example, how far conclusions based on animal experiments could be applied to humans. With this object in view Professor R. A. McCance and Dr. E. M. Widdowson went in 1947 to the British Zone in Germany and arranged for the setting up of a unit of the Medical Research Council at Wuppertal. One of the most pressing questions was the influence on health of the choice between fine white flour, coarse wholemeal flour, or the intermediate type of 85% extraction which came into use in Britain during the war. If the superiority of coarse flour could be proved, the question remained whether it would be possible to bring white flour to the same nutritive level by adding vitamins and minerals.

To answer these questions observations were made on over 300 children, aged 5–15 years, at two orphanages, one at Duisburg and the other at Vohwinkel. Flours of 100% and 70% extraction, and 70% enriched to be equal to 100% extraction flour in aneurin, riboflavin, nicotinic acid, and iron were used at both orphanages, and at Duisburg alone flours of 85% and 70% enriched to the level of 85% extraction flour were tested. The children were divided into comparable groups, and each group was assigned a special flour. The children at Duisburg were strictly disciplined by their German guardians and were given a Spartan diet in which 70%

[1] Widdowson, E. M., and McCance, R. A., *Spec. Rep. Ser. med. Res. Coun. (Lond.)*, No. 287, 1954. "Studies on the Nutritive Value of Bread and on the Effect of Variations in the Extraction Rate of Flour on the Growth of Undernourished Children," H.M.S.O., London. Price 8s. 6d. net.

of the calories were supplied as bread or other flour products. Those at Vohwinkel were more mildly treated and received liberal allowances of fat and sugar, so that they only obtained 35% of their calories as bread. Both diets were very low in animal protein. Heights and weights were recorded for a year, or for as long as the children remained in the orphanages. A large team of experts conducted clinical, haematological, radiological, and dental examinations on the children, and biochemical studies were made of their protein, mineral, and vitamin metabolism. Parallel trials were carried out with similar diets on rats of different ages and on pigs. The mass of data so obtained, statistically regimented with the aid of Dr. J. O. Irwin, has recently been summarized in a report.[1]

Taken without any attempt at critical appraisal, the results showed that the children, who started the trials seriously undersized for their age, were all able to gain height and weight rapidly when they were allowed to eat their fill of any kind of bread. Neither the extraction rate nor the fortification of flour with vitamins made any detectable difference. Possibly the children at Vohwinkel were fatter than children at Duisburg. Children with enlarged thyroids, possibly induced by the addition of chalk to the flour, were seen in all groups. The authors of the report suggest that possibly the children's intake of iodine was just enough to prevent enlarged thyroids when the amount of calcium in the diet was low, but that it was insufficient when the calcium intake was increased. At the end of the experiments children who were given extra supplements of milk grew no more quickly than others who received no extra milk.

These findings must obviously raise doubts on the validity of animal tests on flours as a guide to their nutritive value for the human. Thus the superior growth-promoting power of the coarser flours, as observed in weanling rats, was not confirmed in the children. But lack of adequate evidence of any difference between the flours does not necessarily amount to conclusive proof that they were in fact all equally nutritious. Although the total number of children examined was large, their ages were widely spread, which made it difficult to arrange perfectly matched groups. About half the children retired from the experiments before the desired period of 12 months was completed. Moreover, the average weight curves, judged at first sight, might at least suggest that the Duisburg children did best on the white bread and that the Vohwinkel children did best on the coarser breads. This would be in keeping with the distribution of sugar in the diets. Without sugar the Duisburg children would have derived enough vitamins from any type of bread, eating it as they did in much larger quantities than the Vohwinkel children, and white bread would have benefited them in providing a more concentrated form of energy than brown bread. With plenty of fat and sugar the Vohwinkel children would not have been short of energy, but their smaller intake of bread would have supplied enough vitamins only if made from the coarser flours. But these suppositions are superfluous, since the report states that the small differences in the weight curves of the Vohwinkel children were due to imperfections in grouping the children. It is perhaps rather puzzling to the uninformed that the same imperfections have not affected the height curves. In Widdowson and McCance's own words, "The first conclusion to be drawn from the report is unquestionably that the greatest caution must be exercised in coming to any conclusion at all. Any conclusions that may be drawn must be restricted to the setting in which the scientific evidence was obtained." With this disarming modesty few will venture to disagree.

NEW RADIOTHERAPY APPARATUS AT THE CHRISTIE HOSPITAL

A linear accelerator producing 4-million-volt *x* rays and a betatron producing 20-million-volt *x* rays have been handed over by the manufacturers, the Metropolitan-Vickers Electrical Company Ltd., and are now in operation at the Christie Hospital, Manchester. Both machines, together with a 300-kV Metropolitan-Vickers deep therapy set of novel design, are housed in a special building provided by the Medical Research Council, which will also be responsible for the greater part of the cost of the development work with these machines. The linear accelerator has been paid for by the Ministry of Health as part of a plan to establish a number of these units in selected centres, while the betatron is the gift of the manufacturers. The linear accelerator produces an *x*-ray beam of comparable quality with that of the gamma-ray beam of a cobalt "bomb," and although the *x* radiations are of a somewhat higher penetration there is not likely to be any marked difference in the results of the application of these two types of source to the treatment of cancer. The linear accelerator is capable of a much higher output than that of any cobalt source which is likely to be used, but this is of little or no practical importance, since the output of the massive cobalt units is sufficient for all practical purposes. The 4 meV linear accelerator presents few new problems in the measurement of dosage and the planning of treatment, and it is proposed to use it immediately for the treatment of patients. The betatron, on the other hand, is the only clinical adaptation of this machine in this country, and, as with the 15 meV linear accelerator just installed at St. Bartholomew's Hospital,[1] much experimental work will have to be done before it can be applied to the treatment of patients.

The megavoltage machines at the Christie Hospital will be used to determine the optimum quality of radiation for the treatment of cancer. While in the treatment of deeply seated growths the higher penetrative power clearly affords a technical advantage, the very high megavoltages, of the order of 20 meV, have some disadvantages. For example, the high exit dose (after the beam has passed through the body) may go some way to offset the greater tolerance of the skin through which the *x* rays must first pass. One of the advantages of megavoltage radiation over conventional deep therapy for the treatment

[1] *British Medical Journal*, 1954, **2**, 819.

of certain types of malignant growths, apart from the greater penetrating power, is that the maximum dose from a single field is developed, not at the skin, but at some distance below it, depending upon the quality of radiation. Thus with 4 meV the maximum dose is developed at about 1 cm. below the surface, while with 20 meV radiation it is developed at about 4 cm. Since the skin is among the most easily damaged tissues in the body, this is a great gain. Yet another advantage is that there is no shielding effect of bone at over 1 meV. In an address to representatives of the medical, scientific, and lay press on November 11, Dr. Ralston Paterson, director of the radiotherapy department of the Christie Hospital, stressed that, while it is hoped that the proportion of cures will be increased as a result of the new machines, this form of treatment is applicable only to certain cases, mostly deep growths.

BEACH POLLUTION

The bathing beaches of some coastal resorts are subject to sewage pollution which in addition to the possible danger of spreading enteric and other diseases among the bathers may affect the amenities of the shore by deposition of excreta and slime round the outfall. Many coastal towns have little space for the installation of sewage purification plants, and prolongation of outfalls far out to sea is expensive, though the cost can be weighed against the economic benefits resulting from the attraction of summer visitors. It has hitherto been uncertain to what extent bacteriological surveys may help a local authority to decide on the best measures to overcome such a problem. Moore[1] has recently reported the results of a careful investigation made at a small town on the North Devon coast before and after the putting into operation of a new sewage disposal scheme. In this town there had been a considerable outbreak of paratyphoid fever—ultimately traced to a carrier concerned with the sale of ice cream—but there was obvious pollution of the beach around the broken sewer outfall, and *Salm. paratyphi B* was readily isolated from that area. The local authority proposed to construct settling tanks and a storage tank from which sewage would be discharged at high tide through a longer outfall pipe. Observations were therefore made of the local tides and currents by means of weighted wooden floats with a shaft 3 feet (0.9 m.) long below the surface. Presumptive coliform counts of the sea water were also repeatedly made at twelve points along the adjacent stretch of sandy beach. The degree of pollution indicated by the bacteriological tests agreed well with that to be expected from the sanitary survey and float tests. The new outfall was located appropriately, and the subsequent bacteriological survey gave greatly improved results. Complaints about the beach have ceased. It seems clear that the bacteriologist, by making a large series of relatively simple tests under different conditions of season and tide, may provide the consulting engineer with much useful information. The question of setting up bacteriological standards in an attempt to define permissible limits of pollution is difficult, but Moore's observations, and some American investigations, suggest that the figure not to be exceeded might be of the order of 1,000 coliform organisms per 100 ml. of sea water.

Any estimate of the extent to which infections are in fact acquired by bathing can be based only on extensive surveys carried out at the time a particular infection is prevalent, and reliable information is at present lacking. Winslow and Moxon[2] have attributed large numbers of cases of typhoid fever to bathing in polluted waters, but other authorities—including the Chief Medical Officer of the Ministry of Health[3] and the Joint Committee on Bathing Places of the American Public Health Association and the Conference of State Sanitary Engineers[4,5]—have discovered little evidence and consider the risk to be ordinarily negligible. Against this, Moore[1] mentions a child whose paratyphoid B infection was almost certainly acquired on the beach that he surveyed. More information on this important problem is clearly desirable.

[1] *J. Hyg., Camb.*, 1954, **52**, 71.
[2] *Amer. J. Hyg.*, 1928, **8**, 299.
[3] *Report of the Ministry of Health for the year ended 31st March 1949*, London, H.M.S.O.
[4] "Report of the Committee on Bathing Places," *Amer. J. Publ. Hlth*, 1940, **30**, Suppt. 50.
[5] Ibid., 1952, **42**, Suppt. 99.

A HEALTHY SUMMER

After what has been generally condemned as one of the worst summers in living memory it comes as something of a surprise to find that the nation has surpassed itself in breaking records for good health. If the weekly notifications of infectious diseases may be taken as a guide, they point to a population much less debilitated than usual by summer epidemics, and physically better equipped than ever before to face the horrors of the coming winter with confidence. Especially will that be true, we may hope, of those densely populated cities and new-styled conurbations, where autumn is apt to be a season of mists rather than of mellow fruitfulness.

In England and Wales diphtheria and scarlet fever both reached record low levels in the weekly notifications—diphtheria with four cases in the 34th week and scarlet fever with 313 in the 36th. During the six months April to September the total numbers of notifications of five infectious diseases were the lowest for the last fifteen years. These were acute pneumonia, meningococcal meningitis, enteric fever, scarlet fever, and diphtheria. In addition, the notifications of measles have only once previously fallen to a lower figure (in 1944). But that plague of communal life, dysentery, provided a striking contrast with the highest number of notifications for many years.

The crude general death rate per million has shown only trifling fluctuations since the war. For the months April to September it was 10.0 this year and 10.0 in 1946. In between it has been up to 10.2 (in 1950) and down to 9.7 (in 1948 and 1952–3); this summer has therefore been about average in that respect. On the whole, the nation might well feel grateful to the members of its public health services.

AN EXPERIMENT IN CANCER EDUCATION

BY

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This paper describes an experiment in cancer education conducted by the Manchester Committee on Cancer. It was designed to test the effect of saturating a defined area with intensive propaganda of every suitable kind, to develop propaganda techniques, and to assess effects on the lay public. The experiment (referred to in the 29th Report of the British Empire Cancer Campaign and in editorial comment in the *British Medical Journal*) has now been in progress for over two years. Although unable as yet to evaluate results on any statistical basis, we are able to record some of the lessons learned in the course of the experiment.

Background Organization

The Manchester Committee on Cancer is an independent voluntary organization not linked with any one hospital. Since all hospitals and local authorities in the experimental area can therefore participate on an equal footing, and since the propaganda can be aimed primarily at directing the patient to any doctor or any hospital, the Committee is well fitted to sponsor such an experiment. It gave much thought to the design of the project and is wholly responsible for finance and overall control; in practice, a whole-time salaried executive officer appointed to the project is made responsible for detail. To set down in concrete terms the qualifications required of this officer is difficult; clearly it is more a matter of personality than of any accepted technical qualifications. In this project the executive officer is a layman, but a medical graduate with the appropriate gifts would be equally suitable. The criteria which the Committee had in mind when selecting its executive officer included a university degree, a flair for organization of the public-relations type, ability to get on well with people in all walks of life, and some gift for putting over a difficult subject in simple but accurate terms, both in writing and in public speaking.

Boundaries of experimental area. (Shaded areas are county boroughs.) Total population (1951 Census), 618,866; No. of women (1951 Census), 324,265.

No permanent local committees were set up, but close co-operation with local authorities and pre-existing voluntary organizations was established at an early stage. The creation of local committees would, it was felt, have little advantage, and might hamper the flexibility of the experiment.

The experiment is being conducted in South-East Lancashire and North Cheshire, in an exactly defined area with a population of 620,000; its main centres are Bury, Rochdale, Oldham, Ashton, and Stalybridge (see Fig.). No part of the city of Manchester was included. In addition a "control" area of almost identical population, and of similar social and industrial structure, was defined, in which no special propaganda efforts were known to exist. It is hoped that this area may be used for comparisons, should it prove possible to evaluate quantitatively the results of the project.

Basic Plan

Obviously much depends on the careful orientation of the information supplied to the public and on the points of emphasis. A general directive was therefore set down for guidance on the following lines.

The negative "If you don't do this, then . . ." gambit tends towards fear; a positive approach helps to promote confidence in treatment and replaces erroneous beliefs by reliable and hopeful facts.

The too general claim "Cancer is curable" is avoided so far as is possible. All cancers are not curable, and to base propaganda on false premises is to risk rejection of the whole by a justifiably sceptical public. It pays to admit that some forms of cancer do not respond readily to treatment and to base talks on the fact that some cancers (the accessible cancers) are curable in their early stages. Even the slogan "Early cancer is curable" is not wholly true, whereas "Early cancer of the breast—or the mouth, or cervix—is curable" is true, and therefore justifiable.

Nothing must be done which might create more fear of cancer, already a sufficient problem (Aitken-Swan *et al.*, 1954). With the lurid "This might happen to you" approach, the criticism that education will produce cancerphobia may be justified. It is wrong to say, "These are cancer symptoms," which is sure to be misinterpreted; say instead, "These symptoms are not normal and need a doctor's advice urgently, since one of the many possible explanations could be early, and therefore curable, cancer."

We accept the view, first propounded with convincing supporting evidence by Eleanor Macdonald (1938), that the grand approach with large audiences and spectacular publicity has little permanent effect. Numerous small meetings, informal talks, repeated items in local newspapers, and short but pithy pamphlets form the basis of our approach, the ultimate aim being to saturate the area with every permissible means of education at our disposal and to maintain that saturation.

Whilst fully aware that refresher education of the practitioner is another facet of any cancer campaign, we are not directly concerned with it here. Nevertheless, participation in the scheme, seeing patients who have been influenced by lectures, reading frequent newspaper reports, and so on, is a by no means ineffective way of influencing those in need of a refresher. It may, indeed, be more efficacious than the usual attempts at direct education.

We feel that a campaign of this sort should not be linked, even indirectly, with any appeal for money, and that no expense should fall on any group that invites a speaker. The Committee therefore pays all lecture fees and incidental expenses and does not even stress its own name. To get the potential patient to any doctor, and thence to any hospital, or to influence relatives or friends to give good counsel, is our purpose.

Preliminary Studies

At the outset the experiment was explained to medical officers of health and to local consultants and practitioners at meetings of the medical advisory committees of local hospital groups and local B.M.A. Branches. Comment and criticism were invited, and ready promises of participation in the experiment, both as lecturers and as critics, were made and fulfilled.

The executive officer compiled an index of all organizations in the area. It may be helpful to others who venture on a similar scheme to mention that when the town hall

does not possess a complete list there are many helpful publications from which it can be compiled. Diocesan registers, the annual report of the Mothers' Union, Methodist Handbook of Ministers, Methodist circuit plans, Baptist and Congregational yearbooks, town guides, and local newspapers are a few examples. This was followed by a personal approach to local clergy and the officers of lay organizations by the executive officer. A circular letter, inviting them to ask for speakers, was sent to all whose addresses were known.

A panel of speakers, drawn at first from the staff of the Christie Cancer Hospital, was created. It now includes medical officers of health and their staffs, county divisional medical officers, general practitioners, and superintendent health visitors, as well as consultants from the Ashton, Bury, Rochdale, and Oldham hospital groups. For those in this wider group whose immediate concern is not with cancer, speakers' notes in skeleton form (see description below) were compiled and distributed.

The executive officer paid a personal visit to editors of the 12 local newspapers circulating in the area, explaining the scheme to them and seeking immediate help in publicizing it. Arrangements acceptable to the Committee and to the editors were made to ensure the accurate reporting of meetings and to avoid unfortunate sub-editing.

Copies of all known pamphlets on cancer education were obtained and a small library was created. Later, arrangements were made to buy supplies of suitable pamphlets and prepare others where necessary.

Lectures and their Problems

In the two and a half years since January, 1952, 393 lectures have been given, for each of which an honorarium was paid. Five of these were at large public meetings whose chief purpose was to give an initial impetus to the scheme in each main town. The remainder have been given to small groups of from 12 to 50 at one of the routine meetings of their societies. This, we think, has largely avoided audiences overweighted with the morbidly curious, hypochondriacs, and so on. These small groups include church organizations of all denominations, co-operative and townswomen's guilds, Rotary and Inner Wheel clubs, political parties, community associations, business and professional women's clubs, Soroptomists, St. John Ambulance Brigades, and British Red Cross, as well as rather less obvious groups, such as bowling clubs, Bible missions, old age pensioners' associations, British Legion, and Toc H.

It soon became clear that it would not do to fill each lecture date with the first available name on the panel. A speaker might be a happy choice for a Rotary luncheon, but unhappy and ineffectual before a ladies' sewing class. To know the subject and present it logically is not enough: ideally the speaker needs a flair for sensing the atmosphere of a meeting and matching its mood. Some people have that gift and can be sent anywhere; others must be carefully matched to their audience or they will produce anything but beneficial results. Hence the organizer of such a scheme must get to know his individual speakers well, so that they may be used to best advantage.

It is better to use speakers at some distance from their normal place of work: while forestalling possible criticism of advertisement or self-advancement, distance lends the enchantment of added authority. The definition of an expert as "any ordinary chap from 20 miles away" seems to have particular force in this type of scheme.

So far as possible the speakers should be medical, but the executive officer himself must be prepared to fit in at a moment's notice, and will often have to. If a layman, he will quickly acquire the technique and the knowledge required to answer all common questions. Afternoon meetings are also a problem, to which the only solution is often a talk by the executive officer himself.

The propagandist must be aware of the present beliefs, prejudices, and attitudes of his audience. Telling people that their present beliefs are wrong will never change them. All propaganda should be adjusted to take account of these attitudes and lead on from them, since everything that is said will be heard in terms of them. New suggestions must link up with basic beliefs and lead the hearer to the point where he draws an inescapable conclusion for himself.

Light on this basic background attitude to cancer is shed by a recent Gallup Poll study of opinion on cancer (Paterson *et al.*, 1954).

It is all too easy to upset people unknowingly, and lecturers must therefore be mindful of the possible implications of what they say. One may, for example, say, "Man is not the only creature affected by cancer; fishes, and birds, including domestic poultry, get it." Unless it is made instantly plain that cancer cannot be "caught" from food of any sort, the listeners may find their appetite for fish and chips or leg of chicken much abated.

It is even more difficult to avoid using professional jargon when it takes the form of words with a different meaning in common usage. To talk to the uninformed of "cells" will, if it evokes any picture at all, conjure up visions of dry batteries or the police station. It is here that some form of visual aid is necessary.

In the first year the lectures took the form of a straightforward talk, never lasting longer than thirty minutes, with as much time as necessary for discussion, questions, and answers. They were very well received by the public, and welcomed by local practitioners, but we felt more was needed for full comprehension and acceptance of the ideas presented.

Moreover, since regular visits were asked for and repeated invitations received, changes of approach became necessary to provide freshness. In practice this was much easier than one would have anticipated.

One of the main difficulties of the propagandist is to convey information at the proper level of understanding. This is sometimes determined by the degree of intelligence or standard of education of the hearer, but frequently the gulf between speaker and listener is created only by their differing paths of learning. A doctor is as much out of his depth on the intricacies of cotton spinning as a spinner is on cancer.

Anything which helps to bring the information within effective range of the hearer's understanding is therefore valuable. Since visual impressions are often retained longer and more accurately than auditory, we began experimenting in the second year with various forms of visual aid and evolved a series of flannelgrams.

Flannelgrams.—The flannelgraph is based on the principle that any fabric with a nap will adhere to the nap of another. By using a black filter cloth (or domett) as fixed background, any picture, chart, or diagram, when backed with lint, will stick wherever it be placed on the background. The success of these diagrams was so immediately gratifying that they are now used at all talks. Audiences find they greatly increase the interest and brightness of the talks, present the main points emphatically, and are instantly understood and remembered. Speakers find them convenient because they require no elaborate equipment, are readily portable, and can be used anywhere. They are a boon, too, to nervous or none-too-practised speakers.

Newspapers

Several local newspapers agreed to take a weekly series of "doctor's column" articles. These short articles discuss all health matters, but care is taken to see that cancer crops up directly or indirectly at fairly frequent intervals.

All local newspapers have been very co-operative in printing reports of the talks. A condensed version of the script is usually sent immediately after the talk. Both reports and articles are written by the executive officer and the contents scrutinized by senior members of the cancer hospital staff. Since the scheme began, editorial matter has been printed on no fewer than 465 occasions.

It is often helpful to ask the local newspaper editor to act as honorary adviser on publicity methods in his area. This gives him additional insight into what is being attempted.

The effect of articles and news items in local newspapers cannot be overemphasized. At first we very much underestimated their effect, not realizing the wide distribution of the papers in each district and the way in which they are read from cover to cover over the week-end.

Publications

Five hundred copies of the Central Council for Health Education's pamphlet, "The Role of Nurses and other Members of the Nursing Profession in the Education of the Public concerning Cancer," have been distributed to members of nursing and ancillary services, through local medical officers of health.

Four thousand copies of each of the Central Council's pamphlets, "All about Life Saving," Nos. 1 and 2 (dealing with breast and cervix cancer), were purchased, and are now sent to the secretaries of each society two to three weeks after a talk. We feel that this later distribution of pamphlets is of much greater value in maintaining the initial impetus to propaganda than handing them out at the meeting.

"Notes for lecturers on cancer" are given to all who offer their services as lecturers. Considerable thought has gone into their preparation to ensure that they do make clear the intended orientation of our propaganda. Moreover, whilst they give the speaker all the information he requires in handy form, they must be sufficiently sketchy to require to be worked up and presented in his own way. Their skeleton form ensures that each talk will have an individual flavour and guards against the monotony and endless repetition that would come from a full and detailed script. The speakers' notes had the incidental effect of quieting the initial apprehension of those doctors who started unsure of the effects of cancer education. Seeing our line of approach in this more precise form, they were persuaded that ill results were unlikely.

Oiling the Wheels

The initial circular letter to officials of lay groups is not always enough if one wishes to evoke a widespread response, and this early stage in the scheme requires much personal visiting. It is easy to shelve a circular letter, but less easy to refuse a reasonable verbal request, the granting of which costs neither money nor effort. This approach is, of course, possible only for a full-time organizer. A typical example of its value occurred in one town which, for no obvious reason, was not responding as well as others. There was neither hostility to the scheme nor unwillingness to hear speakers on the subject, but requests for lectures were not coming in as they should. A two-day visit to all local ministers by the executive officer resulted in 13 meetings being arranged on the spot. A personal visit is also much less easily forgotten than a circular.

We also found that people like to have a personal hand in the scheme once they have been interested. Each group to which a speaker is sent is asked to interest others, and address cards are available for distribution at each meeting. Many months after, we still get regular requests for speakers from organizations in some way linked with those already visited.

Local manufacturers are often willing to help generously with equipment. Apart from the obvious usefulness of the material, the effort and expense to which the maker is put fixes the scheme very firmly in his mind.

There is a great fund of public good will for this sort of work, even though it be sometimes covered by a thin crust of suspicion. Where reluctance is apparent, it is usually fatal to argue the case fully. Almost anything gets done in due course if people can somehow be left with the inescapable but unspoken conclusion that it is to their advantage.

Lessons to Date

There was no real opposition to the scheme amongst the doctors of the area once they knew in detail what was intended. Objectors to anything new are often more vocal than their fellows, but not necessarily more right or more reasonable. The aim should be to win support in the beginning and, if necessary, to spend time and personal visiting in winning it. An opinion poll of 50 doctors and lay leaders in the experimental area early in 1954 revealed that the first two years of the scheme had, in their opinion, neither created cancerphobia nor added to work in their surgeries.

Two B.M.A. Division secretaries said that their members were anxious to see the scheme continue, and neither opposition nor hostility was voiced by doctors at any time.

Nor are the public hostile to cancer education. Indeed, once they have had experience of a well-conducted lecture and discussion, they are anxious for more, and groups which may be hesitant at first often ask of their own accord for speakers after hearing of the experience of others.

Conclusion

An experiment has been started by the Manchester Committee on Cancer to test techniques of cancer education in a defined area and to try to shorten the period of delay in seeking treatment for the more curable forms.

The scheme having been launched and given impetus, there is every likelihood that if necessary it will be taken over by the local authorities and maintained as a permanent feature. They are encouraged to do so by the Ministry of Health.

The Committee is satisfied that it is possible without any ill effects to saturate an area with intensive propaganda and to maintain that level of saturation. It is not yet possible to assess results objectively, but there are many indications which suggest that some success is being achieved.

The two main criticisms that cancer propaganda would flood the surgeries and cause cancerphobia have definitely not materialized in the experimental area. Where people have sought advice as a result of the scheme it has been for adequate reasons and not for imaginary cancers. We would say now that any propaganda which inspired either of these criticisms was badly conceived or badly presented.

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In the recently published report on the medical and health services in the Gambia Protectorate for the year 1952 reference is made to an outbreak of smallpox which occurred in the Upper River Division. The first case appears to have been a man who came from neighbouring French territory. Approximately 12 days after he fell ill and died smallpox occurred among the inhabitants in the village where he had been staying. Despite efforts to prevent movement of people the disease spread. Cases of smallpox eventually occurred in the remainder of the Protectorate and in Bathurst, but by that time vaccination campaigns were under way and relatively few cases appeared outside the Upper River Division. In all, there were 222 cases with 8 deaths. The low fatality rate indicated that the disease was relatively mild in type. The fact that the outbreak did not assume larger proportions was due mainly to intensification of the vaccination campaign.

AMERICAN PUBLIC HEALTH ASSOCIATION

82nd ANNUAL MEETING: BUFFALO OCTOBER 11–15

[FROM A SPECIAL CORRESPONDENT]

The annual meeting of the American Public Health Association in Buffalo was attended by over 3,000 delegates representing every branch of public health in the United States of America. Below are noted some of the many topics discussed during the meeting.

Poliomyelitis Vaccine and Cancer

Special interest was taken in a paper by Dr. R. F. KORNS (Albany, N.Y.) on the design and operation of the field trial of the Salk poliomyelitis vaccine. Some 1,830,000 children in the United States, three Canadian provinces, and Finland are now under close observation, nearly half a million of them having received the test vaccine. To date no official disclosure of the initial results has been made by the investigators, but a preliminary report by an independent group under Dr. Thomas Francis, jun., of the Poliomyelitis Vaccine Evaluation Centre, University of Michigan, is expected next April, only a few months in advance of the next poliomyelitis season. Dr. Korns emphasized the intense concern on the part of the profession, school authorities, and the public in the development of a safe and practical immunizing agent against paralytic poliomyelitis.

At a session on lung cancer and its association with cigarette smoking, the Public Health Cancer Association voted to advise the public to stop cigarette smoking. But the medical scientific director of the tobacco industry's research committee declared that no convincing clinical or experimental evidence of such an association had yet been produced. "Lung cancer in men," Dr. LEVIN said, "has not been linked with any constitutional or hormonal abnormality, nor has it been shown that cigarette smokers have any inherent constitutional or hormonal abnormality as suggested by certain investigators."

Dr. GOLDEN, of Cornell University, gave a report on an analysis of 722 persons who had reported to tumour diagnostic clinics for a check-up. As many as 42% were found to be suffering from cancer. This pointed, he thought, to the need for better education of the public in the symptoms of malignant disease.

Industrial Health

In the Industrial Hygiene Section Dr. GOLDNER described a study of the hearing of shipyard workers. Six hundred workers were examined, and four hundred of these had various degrees of occupational deafness. His conclusions were that noisy machinery should be redesigned if possible, but otherwise employees should work at noisy jobs for only short periods at a time.

In an investigation into absenteeism among 1,300 women telephone operators and 1,500 male craftsmen in the telephone industry, a team from Cornell found that one-third of the workers were responsible for 75% to 80% of the time lost. This group was mainly composed of the unhappy, the frustrated, and those with emotional upsets and moods. They experienced three to ten times as much minor and major illness as those with the best records.

Dr. A. MASSEY, chief medical officer, Ministry of Pensions and National Insurance, addressed the Medical Care Section on "Industrial Injuries under the National Insurance Scheme in Great Britain." He showed how employers' liability had been replaced by State insurance, and described the present medical adjudication machinery. The Ministry's research responsibilities were among other matters covered in a paper which attracted much attention.

Health of Schoolchildren

There were a number of papers dealing with the physical and mental health of pupils and the training of teachers as health educators. Dr. CHARLES WILSON, of Yale, called for a study of sanitary conditions and practices in school lunch schemes, for he considered that there were needless outbreaks of food-borne diseases among schoolchildren. More than ten million schoolchildren in the United States eat noon meals, yet there are serious questions of cleanliness in some food-service operations, such as dishwashing, food storage, and refrigeration. Dr. AUSTIN HILL told the conference that only 35% of all schoolchildren in America have good diets despite the availability of sufficient food. Poor nutrition was not solely an economic factor, as many families in the lower-income groups were well fed, whereas many in the higher-income groups showed malnutrition.

At the meeting of the School Health Association stress was laid on improving the quality of the athletic experience given in schools. Athletics should be regarded not only as a means to physical development, but as an important factor in total development. Too much attention was being paid to competitive inter-school games.

Social Problems

Dr. MAURICE WILLIAMS, medical officer of health for Southampton, read a paper on the rehabilitation of "problem families." He quoted the Southampton incidence as being 3.6 per thousand families. He advocated the appointment of area officers for early ascertainment of families showing evidence of going downhill, so that remedial measures could be introduced while rehabilitation might still be possible. The rehousing of some families, combined with help towards furniture and household equipment, often encouraged them to improve their standard of living.

Dr. M. G. CANDAU, Director-General of the World Health Organization, said that W.H.O. would have to turn down requests for medical assistance next year to the tune of two million dollars. The work of W.H.O. in fighting disease in all parts of the world was being hampered by a small budget. Although it boasted a membership of 84 countries, W.H.O. operated on under ten million dollars a year, of which the United States subscribed one-third.

The final session of the meeting was devoted to an address by the retiring president, Dr. HUGH LEAVELL, of Harvard University, his theme being the need to study the best use of the community's total health resources.

At the conclusion of the session the president conferred honorary fellowships on Rajkumari Amrit Kaur, Minister of Health for India; Dr. Andrew Topping, Dean of the London School of Hygiene and Tropical Medicine; and Dr. H. C. Maurice Williams, of Southampton, chairman of the Royal Sanitary Institute.

The Birmingham City analyst, Mr. H. H. Bagnall, draws attention in his recent annual report to the gradual debasement of certain terms which at one time had a specific meaning in relation to food, but which are gradually coming to be associated with foodstuffs bearing less and less resemblance, and inevitably inferior, to those originally described by the words. Mr. Bagnall quotes two or three instances from recent reports: for example, methyl cellulose, a purely artificial product sold as meringue powder; "selected" cheese consisting of skimmed soft cheese; rissoles sold as beef cutlets; and chicken noodle soup containing 2% chicken fat and no chicken meat. Before the war "cream" was expected to contain about 50% fat; poorer-quality articles were sold by such names as breakfast cream or coffee cream, but even so might contain as much as 25% fat. "But in the Food Standards (Cream) Order the word 'cream' is associated with coffee, single, pouring, or fruit cream, and denotes an article containing possibly only 18% fat. In these progressive days it is necessary to ask for 'double' cream in order to be sure of getting the old-fashioned 'cream' containing 50% fat."

BRITISH MEDICAL STUDENTS' ASSOCIATION

MINISTER OF HEALTH AT ANNUAL MEETING

The British Medical Students' Association held their 13th annual meeting at B.M.A. House on November 12, 13, and 14, under the presidency of Mr. A. B. GILMOUR. On the first afternoon the Minister of Health, Mr. IAIN MACLEOD, spoke to the students about general practice—the requirements for it, the means of entry, and the opportunities the life offered.

The meeting was opened by Lord HORDER, who declared his pleasure in the work the B.M.S.A. was doing to encourage student travel. "If I had my time again," said Lord Horder, "one of the things I would do would be to travel more and travel earlier." He was not speaking of holidays, he explained, but of travel in pursuit of their vocation. In his day they thought that if there was anything in medicine worth learning it could be got at their own medical school; but it could not. "Any one school, however high its prestige, is parochial." When he first joined the visiting staff at Bart's he had begun his protest against the parochialism in medicine by arranging ward rounds with physicians at Guy's, the London, and George's. The scheme flopped, but he still thought it a good idea.

Lord Horder then invested Mr. Gilmour with the president's Badge of Office, the badge being Lord Horder's gift to the association.

Advice for the Student

After lunch Sir CECIL WAKELEY, P.R.C.S., who had earlier accepted the office of honorary president, addressed the meeting. It was essential for the modern student, he said, to take part in discussion and meet people of all kinds. Travel and conferences were most valuable. Neither should the student neglect the classics. They were living in an age of committees, he continued. "Whatever you do when you qualify, wherever you go, you are going to find committees." Now was the time to learn committee procedure, not when they were qualified.

He advised his audience to publish reports of cases as soon as they could—while they were housemen. When a selection board interviewed candidates short-listed for a consultant appointment the candidates were usually all well qualified and equal in that respect. But, said Sir Cecil Wakeley, "generally speaking, the lay people on the board attach weight to published articles." The lay public were alive to the fact to-day that a publication by a doctor meant that he was taking a real interest in his work.

In introducing the Minister of Health and thanking him for coming to the meeting, Mr. GILMOUR was able to tell him of the great growth of the B.M.S.A. since their last meeting in London six years ago. Now the association represented over 90% of the medical students in Great Britain, and recently the association had been elected to the chair of the International Federation of Medical Student Associations. Many of the activities of students did not directly concern the Minister, declared Mr. Gilmour, but their future he controlled to no small extent. In particular, they were anxious about the pre-registration period and the entry into practice.

Mr. Macleod on General Practice

Mr. MACLEOD began by referring to the Medical Act, 1950, which provided for the "intern year." They were now just reaching the time when they could see the first results, though it was too early for any dogmatic pronouncement. "I would like to give you an invitation to let me know your views," said the Minister. "Send them direct to me and I promise you that I will consider them personally." The Minister then turned to general practice. He did not believe that the opportunities available to the family doctor had diminished in the least since 1948. In some ways they were greater. All the attention focused on general practice simply meant that now was a formative period.

Both learning and wisdom were needed by the good general practitioner, went on Mr. Macleod. Wisdom would be acquired through their contacts with patients and friends, and for this reason he welcomed the increasing tendency of medical schools to give their students something of an inside view of general practice. It could help both those who themselves were going into practice and those who would work in hospitals. He would also like to commend to them the opportunities offered by the Clinical Research Board. He hoped that if they went into general practice they would maintain some contact with the academic side of medicine and not neglect the possibilities of research.

Were they ready for general practice, asked the Minister, after they had completed the pre-registration year and their National Service? He thought not, certainly not as a principal. "I do not think your experience can possibly be adequate at that stage." There were two usual ways of entering practice. The first was as an assistant, often "with a view"; here the chances of eventual partnership had improved since the Danckwerts Award and the efforts of the Working Party. The second way was to become a trainee assistant.

After the period of apprenticeship came the more difficult business of becoming a principal. It might be done by becoming a partner after an assistantship "with a view," by applying for advertised vacancies, or in some areas by setting up on their own. His advice to those looking for somewhere to practise was "Go North." Far too many people wanted to work in the South. In the North there were greater opportunities, as there were fewer doctors. It was true that they still had to solve the problem of those who did not want to stay there all their lives. They needed some means to facilitate exchange of practices.

In conclusion, Mr. Macleod referred to group practice. He would like to see this form of practice developed. It offered more promise for the future than the development of health centres. In many cases, he said, if the area were suitable, the best form of general practice was group practice.

The remainder of the meeting was taken up with various business sessions. At the annual dinner, held at Simpsons-in-the-Strand, Professor G. GORDON LENNON proposed the health of the B.M.S.A., and Mr. GILMOUR replied. Mr. JAMES COPE proposed the health of the guests, and responses were made by Lord HORDER and Sir HENEAGE OGILVIE.

The British Film Institute's new catalogue of *Films on the Sciences*, published last July (price 1s.), contains a comprehensive list of scientific films. The selection of films was made by the Scientific Film Association and the British Universities Film Council, and also by a panel from the *Scientific Selection Subcommittee of the National Film* Library. A large section of the catalogue is devoted to films of medical interest. They are divided into groups under such headings as anatomy, physiology, pharmacy and therapeutics, clinical medicine, surgery, obstetrics, cells and bacteria, and child psychology. Many of the films are in colour, and some are highly specialized and may be booked only by a doctor, sister tutor, or university specialist. The films in this section vary in length from one lasting one minute, showing the pulsatile qualities in a case of aortic aneurysm, to an American film about Sister Kenny's concept of the treatment of infantile paralysis, which lasts 95 minutes. In a Russian film made in 1942 an operation may be seen showing the removal of a bullet from a soldier's heart. The films listed in this catalogue can be hired from the British Film Institute, 164, Shaftesbury Avenue, London, W.C.2.

Reports of Societies

PSYCHOGENIC RHEUMATISM

The Section of Physical Medicine of the Royal Society of Medicine met on November 10 to discuss "Psychogenic Rheumatism." Dr. DORIS BAKER, president of the Section, was in the chair.

Dr. DESMOND O'NEILL (psychiatrist, St. Mary's Hospital, Paddington), opening the debate, said that as a psychiatrist he preferred the term tension pain to psychogenic rheumatism, because patients with this syndrome often presented themselves in other clinics, such as the medical or gynaecological, and the pain was not always rheumatic in distribution; tension pain in the abdomen was common in women. Patients with tension pain complained of various sensations over a wide area of the body; the distribution was usually, though not always, symmetrical about the body axis, and did not correspond to the picture of organic rheumatism. The pain was often described as burning, which physiologists knew as the quality associated with pain from the skin and not the deeper structures, but could also be aching, sharp, or dull. It was often bizarre and indescribable, and sometimes the patient seemed to be trying to convey an emotional experience rather than a pain. As a rule the pain was constant from morning to night, though it might vary with fatigue. The temporal correlation with stress was generally close, and the onset and course of the disorder were related to experiences which disturbed the patient. Other manifestations of tension, such as poor sleep, bad dreams, irritability, and depression, were present in most patients, and some showed other stress disorders besides tension pain—for example, migraine or that type of dyspepsia which could be called abdominal discontent.

The incidence of tension pain seemed much higher in women, said Dr. O'Neill, but no specific personality type was prominent. The pain was often employed to some purpose in the patient's life, such as the evasion of responsibility or escape from an uncomfortable domestic situation. Perhaps mainly for this reason, treatment tended to be disappointing in its results. Where there was depression associated with the pain, as was not uncommon, electroplexy might be valuable. The psychiatrist—"disguised as a doctor"—could play a useful part in the management of tension pain if he was a member of the physiotherapeutic team and worked closely with them. A useful device for recording pain was the pain chart (a body outline), and Dr. O'Neill showed three typical charts. Common sites for the pain were the lumbar region and the neck.

Dr. P. E. SUNDT (psychiatrist, St. James's Hospital, Portsmouth) discussed the dangers inherent in the use of words like psychogenic and rheumatism, which gave a false sense of security to both patient and doctor, in keeping with their lack of specific connotation. Psychosomatic disease was a fashionable label which had currently replaced focal sepsis. It could be a dangerous red herring when the onset of organic symptoms coincided with signs of emotional stress, which could be found in most people. The uncritical use of scientific methods of investigation could be equally dangerous if applied to the individual problem presented by the patient with psychogenic symptoms. There was a grave risk of losing sight of the human element.

If only patients would tell the truth, went on Dr. Sundt, much of the difficulty of treatment would vanish. It was probably better to give the patient a definite diagnosis, such as fibrositis, rather than to say that she was suffering from "nerves." The value of psychotherapy lay in removing secondary worries; it could not achieve very much else, because the patient with psychogenic symptoms stood to gain from them, and was therefore loath to give them up.

Management of Cases

Dr. ERNEST FLETCHER (rheumatologist, Royal Free Hospital) defined psychogenic rheumatism as the musculoskeletal manifestation of tension states and psychoneuroses. Analysis of selected series had shown that 40–50% of patients with "rheumatism" suffered from these symptoms, and the incidence was high in wartime and in those seeking insurance benefits. These patients did not necessarily attend physical medicine departments; psychiatrists saw many more cases, and an experienced general practitioner would seldom refer them to hospital; the latter was the person best equipped to treat them. During the past year the incidence of primary psychogenic rheumatism found in the Royal Free Hospital was less than 4%, although the occurrence of a considerable functional overlay in patients with minimal disease was higher (J. H. Jacobs, personal communication).

Dr. Fletcher stressed the importance of complete physical examination and basic investigation before diagnosing psychogenic rheumatism, because a number of organic diseases might begin with vague aches and pains, among them ankylosing spondylitis, carcinomatosis, osteoporosis, cervical spondylosis, and tumours of the spinal cord. It was important to search for phobias such as of arthritis and cancer, and a firm diagnosis together with a rational explanation of the patient's symptoms was probably the best form of therapy. It was dangerous to label the disease "fibrositis"—the doctor was absolved from any further thought on the matter, and the patient had a convenient and acceptable explanation for her symptoms. Simple psychotherapy should be tried, but, if there was evidence of depression or hysteria, treatment was best left to the psychiatrist.

Dr. W. S. TEGNER (director of the department of physical medicine, the London Hospital) said that the mere absence of physical signs was no excuse for a failure in diagnosis; even neurotic patients could suffer from organic disease.

He asked why the patient with psychogenic rheumatism chose rheumatism. The answer might in part be due to fear of a crippling disease; more important, however, was the fact that the term was a vague one, covering a variety of aches and pains. Rheumatism was a common and non-fatal condition, of long duration and socially acceptable, and characterized by relapses which could occur at suitable times of stress. Treatment by physical methods and the necessity for regular attendance at hospital made it a safe means of escape for an inadequate personality. The management of the condition was one of the most difficult in all medicine, because patients were often reluctant to lose their symptoms; tense and demonstrative, they were capable of demanding treatment which often did no good. It might indeed be a mistake to try to cure them. They were often content with years of passive physiotherapy—"the only thing that has kept me going." They exhausted the general practitioner, the consultant, the psychiatrist, and the specialist in physical medicine. One could do nothing; such patients would always be with us, and it was the duty of all members of the team to share the responsibility for their management.

"There is not a chair of social medicine in any medical school in the United States. One school of public health has had the courage to designate a department of social medicine as a field for postgraduate study. In the medical schools, however, the term has been avoided. For the most part medical-school departments are called public health and preventive medicine or perhaps just preventive medicine, the term being applied in its general meaning. Occasionally one finds a department of community health or a department of environmental medicine."—J. P. Hubbard, *New Engl. J. Med.*, 1954, **251**, 514.

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

The Dormant Cancer Cell

SIR,—Professor Geoffrey Hadfield in his Kettle Memorial Lecture (*Journal*, September 11, p. 607) has described the "dormant cancer cell" and has suggested that this phenomenon might seem to fall within the category of unsolved and insoluble biological mysteries if it were not for the analogous condition, to which the lecture is devoted, induced by exposure to low temperatures. Any search for the occurrence of the dormant state of cells under normal conditions might lead one to consider, in passing, the state of "delayed implantation" of the mammalian embryo, although there are obvious differences between the two sets of phenomena. No claim is made here to present a comprehensive report upon the very scattered literature of this subject. The material which follows is taken from *Patterns of Mammalian Reproduction*, by S. A. Asdell,[1] a book containing an immense quantity of data, of which I learned from Dr. H. Gruneberg, of the Department of Genetics, University College, London.

"Delayed implantation is an interesting phenomenon found in some species, particularly in the *Mustelidae*. The duration of gestation in many of these—for example, the European badger and the American marten—is about 250 days. Fertilization takes place in July or August, the egg develops for a few days, then lies dormant in the blastocyst stage until January, when it is implanted. Development now proceeds normally and birth is in March. Actually, the embryo is growing for about 50 days. The dormant period can be reduced by at least three months by exposing the pregnant females to artificial light during the winter, a result which suggests that activation of the pituitary gland is involved, though the injection of prolactin delays implantation. Other species with delayed implantation are the armadillo, the roe deer, and probably the bears and seals. The roe deer is interesting, as this species breeds outside the normal season for Cervidae in the temperate zone, yet the young are born, because of this modification, at the usual time for the family as a whole."

Details of the process in some individual groups and species are quoted below. In the *Mustelidae* "some species have an excessively long gestation period, almost a year, and in these delayed implantation is the cause." "Delayed implantation of the embryos is probably common in the Xenarthra (armadillos), and in this connexion it is interesting to note that the activity of the corpus luteum is believed to be in abeyance until implantation occurs." The Mulita armadillo "has a gestation period which is prolonged by delayed implantation. In Argentina implantation occurs about June 1, and birth is in October." "The American badger mates late in summer, from August to September; implantation does not occur until about February 15, and the young are born about April 1." "The European badger breeds late in July and early in August. Implantation does not occur until January, and in the interval the blastocyst lies free in the uterus. Birth is in March." In the European brown bear "mating is in April–June, and the period of gestation is about seven months. The young are born from December to January, depending on the locality, and it is believed that delayed implantation is the rule." The northern fur seal "has its young from about June 20 to July 20, and mates a few days afterwards. The corpus luteum persists for more than a year. Embryos have not been seen macroscopically in females killed in November; consequently, it is believed that delayed implantation is the rule, especially since blastocysts have been found in July and August."

At first sight the non-implantation of the blastocyst, followed by its attachment to the uterine mucous membrane, might be thought to present a purely mechanical analogy to the turning-on of an electric switch, and to have no bearing upon the chemical reactions around a cancer cell embedded in another tissue. But in view of our ignorance of the complex conditions at a cell surface one may not wish to insist upon any fundamental difference between the two conditions, and the behaviour of the blastocyst must have some chemical basis. The phenomenon described by Professor Hadfield is of such importance that one feels justified in making a wide search for any similar process.

While considering discontinuous growth, one is tempted to refer to what is perhaps the most extraordinary instance of one form of such growth, though it may have no bearing upon the problem of the dormant cancer cell. The annual replacement of the stag's antler presents a truly colossal effort of calcium metabolism; the factory then closes down abruptly and does not reopen until the following spring.—I am, etc.,

London, E.C.1. E. L. KENNAWAY.

REFERENCE

[1] *Patterns of Mammalian Reproduction*, 1946. Comstock Publishing Co., New York.

Registration of Cancer Cases

SIR,—Everybody interested in cancer will be pleased to hear, as stated in Parliament, that three more regional boards have decided to set up "central registration bureaux" (*Journal*, October 30, p. 1054) and presumably they will make it compulsory for every hospital in their area to have a modern records and follow-up department. Until every hospital in the country is compelled to have such a department it will be impossible to be certain of even basic figures, such as the annual incidence of cancer.

There are comparatively few hospitals with modern record and follow-up departments, although most hospitals have a patient indexing department, so that the notes (not always very complete) can be obtained when the patient returns. Such hospitals are like a factory owner who knows roughly the number of total tons of raw material entering the factory but has not the slightest idea of the kind or quality of the finished article which leaves the factory. How can medicine, not only cancer, progress under such circumstances?—I am, etc.,

York. MALCOLM DONALDSON.

A Penalty of Partial Gastrectomy

SIR,—Mr. James A. Ross (*Journal*, October 30, p. 1049) is to be congratulated for airing this problem, which is, I suspect, more common than many of us would care to admit. Until we can cast off the iron-bound concepts and generalizations which were often promulgated with an air of authority in inverse relationship to the promulgator's knowledge of working conditions, hardship will be done to many a poor man willing and eager to earn his daily bread. The more one sees men at work, the more one is drawn to the inescapable conclusion that what matters most is the will to work and outlook of the patient.

Much is heard of "compensation neurosis" and its allied disorders, and far too little of men doing heavy work with disabilities that could guarantee failure at any medical examination. Too little stress is placed on the effort the husband will make for the sake of his wife and young family. And, when all is said and done, and he works at a job which, by all the canons, is too heavy, is he any the worse? Nature has provided us with an excellent series of warning systems, one or more of which will give ample warning of an impending breakdown before any damage is done.

In the last six years I have seen a case of disseminated sclerosis (wife and young child) remit and carry on as a heavy labourer; a man of 50 after years of invalidity have a partial gastrectomy and return to shift work without a backward glance; and a delightful and intrepid friend who insisted on continuing to do parachute jumps with most of his left shoulder shot away. And so on. Let us ponder deeply, Sir, before we deny to any man the right to earn

his living. We have only to recall the superhuman feats of some prisoners of war of ten years ago to realize the heights to which the will can raise the ordinary man.—I am, etc.,

Rotherham. R. McL. ARCHIBALD.

Congenital Malaria in England

SIR,—Did the mother of the infant described in Dr. S. B. Dimson's article (*Journal*, November 6, p. 1083) deliberately omit "to mention that she had come from Lagos, Nigeria, and that she had contracted her first attack of malaria one week before returning to this country," or was it in fact that she was never asked about her recent geographical movements? This secrecy, or indifference—whichever it was—was apparently maintained through the concluding four months of pregnancy, despite her persistent and refractory anaemia, and during the first eight days of the infant's severe illness, and nearly cost her "precious" infant its life.

It would not prolong the student's curriculum unduly, and it would most certainly avert disasters, or near disasters, such as that reported by Dr. Dimson, if it could be indelibly impressed on the mind of the medical student that *every* medical history must include a history of the patient's recent geographical movements.—I am, etc.,

London, W.1. L. EVERARD NAPIER.

Encephalitis After Yellow Fever Vaccination

SIR,—Dr. J. Hewgill Smith's account (*Journal*, October 9, p. 852) of an infant who developed encephalitis after a yellow fever vaccination has now been followed by the report of two more cases in infants. As this procedure is compulsory for all individuals (regardless of age) who wish to enter the yellow fever endemic zones, a risk to infants of encephalitis is a matter of concern.

At the vaccination clinic of the Hospital for Tropical Diseases the 17 D strain of yellow fever virus prepared by Burroughs Wellcome and Co. has been employed for several years, and, as the following figures show, very large numbers have been vaccinated: 1951, 15,169; 1952, 16,770; 1953, 17,729; 1954 (until September), 9,521. These figures included many infants of two weeks or more who received the same dose (0.5 ml.) as adults. The yellow fever injection was usually given three or four days before a primary smallpox vaccination, or, if the baby had been recently vaccinated for the first time, three weeks were allowed to elapse before the yellow fever vaccination. In the cases reported no mention was made of any smallpox vaccination given at the same time as the yellow fever injection, but, as in both procedures living viruses are employed, it would seem prudent to separate them by a suitable interval.

From an experience of some 60,000 yellow fever vaccinations of people of all ages at the clinic it has been extremely rare to hear of any serious effects from the injection. When the infants were brought back after a few days for their primary smallpox vaccination, mothers almost invariably reported that the yellow fever injection had not upset the baby at all. The cases described by your correspondents, although they occurred after a yellow fever vaccination, are also encountered in infants who have received no injections. Even if they were not simply coincidental, an encephalitic reaction would appear to be of such great rarity that vaccination with the 17 D strain of yellow fever virus should still be regarded as a safe procedure for an infant who will be exposed to the risk of yellow fever (with its high mortality) in an endemic zone.—I am, etc.,

London, N.W.1. LEONARD ROODYN.

Epithelioma Due to Tar Ointment

SIR,—I read with interest the report by Dr. J. O'D. Alexander and Mr. K. I. Macrosson (*Journal*, November 6, p. 1089) on squamous epithelioma probably due to tar ointment in a case with psoriasis. So unusual is this case—the age of the patient (many years before skin epitheliomata are commonly seen), the unusually brief exposure to carcinogen, the apparent absence of any other pre-malignant or benign tar tumour on other parts of the body treated with tar, and the appearance of a tumour within a patch of psoriasis—that I question whether the diagnosis of epithelioma is correct. No note on the duration of the tumour is given, but one judges it to be relatively recent, since the tar-containing ointment was used for three months, suggesting an unusually rapid rate of growth for a skin epithelioma. The other disturbing feature is the clinical description, which resembled the so-called "button epithelioma," being raised 3–4 mm. above the skin, with firm rolled edge, and the centre showed slight ulceration, without discharge.

With the solitary exception of the histological report all the reported features of this case are convincingly those of molluscum sebaceum, and further histological examination of the specimen should be done and reported before this important case can be fully accepted.—I am, etc.,

Birmingham, 4. W. H. BOND.

Surgical Induction of Labour

SIR,—I read with interest the paper on this subject by Drs. R. A. Tennent and M. D. Black (*Journal*, October 9, p. 833). Their main indications for surgical induction were (1) prolonged pregnancy and (2) toxaemia of pregnancy. In reference to such cases which fail to start in labour after induction they quote from a paper of mine[1] as follows: "It has been suggested by Gibson (1952) that such patients who do not go into labour within 72 hours in these conditions should be delivered by caesarean section." They go on to state: "As no warning of foetal danger was evident in our cases such a policy would have involved the performance of 113 caesarean sections, 108 of which would have been unnecessary."

Quotation out of sequence is always misleading. In my paper I suggested that caesarean section should be considered (*a*) if pre-eclamptic toxaemia showed a serious increase during the prolonged latent interval; and (*b*) if the baby was healthy and of more than 35 weeks' maturity, because of the risk of intrauterine death consequent on continual drainage of liquor, reduction of the placental site, and ascending infection. However, I was against induction of labour as a treatment for prolonged pregnancy and certainly would not have contemplated induction on anything but the strongest grounds when the cervix was "unripe" and the head still above the brim. It is probable, therefore, that most of the 108 cases in which I am quoted as advocating unnecessary caesarean section would not have been induced by me.—I am, etc.,

Lurgan, N. Ireland. G. B. GIBSON.

REFERENCE

[1] *J. Obstet. Gynaec. Brit. Emp.*, 1952, **59**, 814.

Afibrinogenaemia in Pregnancy

SIR,—In the annotation on "Afibrinogenaemia in Pregnancy" (*Journal*, November 6, p. 1096), the need for prompt treatment of the clotting defect is mentioned, but only two diagnostic points are given. These are failure of the blood to clot within 48 hours and micro-electrophoresis of plasma to show the absence of fibrinogen. When incoagulable blood is received at the laboratory for cross-matching, an immediate, conclusive diagnosis of afibrinogenaemia can be obtained by adding a potent preparation of thrombin to the blood and observing whether a clot is then formed. If a clot is formed its bulk is compared with that of a clot formed from normal blood. Absence of a clot is conclusive evidence of the absence of clottable fibrinogen, and the size of the clot is an indication of the amount of fibrinogen present (the comparison being made before clot retraction becomes evident).

Commercial preparations of thrombin are available, and in the absence of these a satisfactory, stable thrombin solution can quickly be prepared by the method of A. S. Douglas. This method consists of diluting one part of a normal oxalated or citrated plasma with nine parts of distilled water, and adding to this 4 to 5 drops of 0.1% acetic acid and allowing it to stand for

20 minutes for the precipitate to settle. This is then centrifuged and the supernatant fluid is decanted off and the precipitate is dissolved in 2 ml. of veronal buffer or physiological saline in a water bath at 37° C. To this solution 1 ml. of a solution containing equal parts of thromboplastin solution and M/40 calcium chloride is added. The thrombin formed in the solution remains stable at 4° C. for many days.

Some patients, though not showing afibrinogenaemia, show diminished clottable fibrinogen in their plasma. This can be demonstrated by serial dilution of the patient's plasma to find the dilution at which a clot can still be obtained in a fixed volume with a fixed quantity of the thrombin preparation. The results for a normal plasma, and plasma from a patient (with mitral stenosis and a recent popliteal embolus) whose blood showed nearly complete lysis of a clot 20 minutes after taking, are shown.

Plasma Dilutions	Patient	Normal Control
1/10	Clot obtained	Clot obtained
1/20	" "	" "
1/40	No clot obtained	" "
1/80	" " "	" "
1/160	" " "	" "
1/320	" " "	No clot obtained

Many patients showing clot lysis and diminished clottable fibrinogen also show increased non-protein nitrogen values in their plasma, but there are occasional exceptions to this finding.

Fibrinolytic activity to an extent that a clot has been seen to disappear within a minute of its formation has been seen once during a bedside Lee and White coagulation test. This was in a patient with an acute ante-partum haemorrhage who subsequently died. Minor degrees of clot lysis are more common especially in cases of acute haematemesis. Lysis can be distinguished from a clot retraction by the ragged appearance of the remaining clot and its partial disintegration on agitation with the liberation of numerous red cells.—I am, etc.,

London, N.12. PETER WOLF.

Tuberculous Patients in General Hospitals

SIR,—It is a fundamental principle that prevention is better than cure, and for many years the outcry has been for preventive medicine, and justly so. I was therefore appalled to read in the *Glasgow Evening News* of September 29 that an emergency solution to the tuberculosis problem might be to take over some of the wards in the general hospitals for tuberculous patients, thus destroying a great deal of our success and hard work and turning back the clock in the field of preventive medicine. This emergency evidently has arisen owing to the shortage of tuberculosis nurses.

It is a well-established fact that the organized battle against tuberculosis depends among many other things on isolation and improved living conditions. If this decidedly retrogressive step in preventive medicine is pursued, will the nurses attending to the tuberculous patients have separate isolated living, dining, and social quarters, etc., or will they be allowed to associate with the general nursing staff? If the latter, then it is plainly manifest that those nurses treating tuberculous patients will act as potential carriers (even though they may not contract the disease themselves), with the possible spread of infection when they mix with the general nurses who in turn mix with their patients, many of whom are hospitalized for weeks and in some cases many months, thereby producing a vicious circle. I therefore strongly appeal to the medical profession to rise as a body against allowing patients suffering from pulmonary tuberculosis to be admitted into the wards of the general hospitals. Would the powers that be advocate the admission of scarlet fever, measles, diphtheria cases, etc., into general hospitals, like "the bad old days"? Certainly not. We must never wittingly or unwittingly run the risk of spreading further infection.

It would appear from the authorities concerned that the only solution to the question is nurses and still more nurses. In my opinion, the nursing shortage is only part of the problem. There is only one solution to the ultimate victory against the white man's scourge, and that is to treat it as a military problem and declare an all-out war against tuberculosis, and this can only be accomplished by a comprehensive policy including the building of sanatoria throughout the country fully equipped for all medical and surgical treatment, because it has been shown that wherever there are enough beds for those who have the disease, so that isolation and appropriate treatment can be carried out, the number of active cases and the number of deaths have rapidly fallen.—I am, etc.,

Glasgow, S.W.3. ARNOLD B. COWAN.

The M'Naghten Rules

SIR,—Dr. Eliot Slater (*Journal*, September 25, p. 713) has certainly aroused opposition by denying free will. There is in fact no end to the determinism *v.* free will argument. Whenever the banner of determinism is raised, many are personally affronted, like

> ". . . the young man who said 'Damn,
> I have just found out that I am
> A being that moves
> In predestinate grooves.
> In fact not a bus but a tram.'"

Nevertheless, as doctors, we do believe in causality. We believe that a patient gets tuberculosis because he encounters some tubercle bacilli at a time when his resistance is low. In the same way a psychiatrist believes that a patient may get a depression because, coming of depressive stock, he has just suffered a severe bereavement. The only alternative to belief in causality in medicine is to believe in demonic possession. The demonic possession theory is out of fashion except where psychopathic behaviour is concerned. If a psychiatrist says that a man committed a crime because he lacked all affection in early life, was deserted by his parents, had no stability or training, so that in later life he acted impulsively and without any sense of responsibility to others, the psychiatrist is accused of either sentimentality or determinism. But free will does not necessarily come into it so much as how society is best protected and the criminal most sensibly treated.

Punishment of the criminal is society's long-established way of protecting itself. The purpose of punishment is (1) deterrence or reform of the individual, like an inhibitory electric shock to one of Pavlov's dogs, and (2) to encourage the others—i.e., the miserable lot of the criminal, when advertised, is supposed to provide a stimulus to the rest of the community to avoid crime. Capital punishment is in a class on its own. You can't reform a man by hanging him. It probably also has little deterrent value, as a murderer is usually a thoughtless man who does not think of the consequences. The only possible argument for capital punishment is that it prevents that individual from committing the crime again. From society's point of view, a murderer is hanged for the same reason that Elizabeth I had Mary Queen of Scots beheaded: she wanted to be rid of her dangerous cousin. Society may equally reasonably wish to be rid of dangerous people like Christie, Haigh, and even Straffen, however badly he does intelligence tests.

In the past, the metaphysical concept of intent or *mens rea* has been useful for the law, because often, if a man is sensible enough to appear to have intent, he may be sensible enough to be deterred by a punishment. The M'Naghten Rules are a statement of the use of this rough and ready, though basically unsound, concept. It is basically unsound in theory, because its application depends on what was the intent of the criminal at the time he committed the crime, a thing which not even the criminal himself knows. It is unsound as a practical pruning-knife, because it only spares the incorrigible. "Judge not, that ye be not judged," said Jesus, but for the last two thousand years we have not ceased judging one another. The time has come to regard this concept of intent as a relic of pre-Christian ethics. Our task, as doctors, lawyers, or civilized citizens, is not to speculate about free will or intent, but to try to solve the great problems of criminology: Which offenders are best

re-educated and trained? Which would respond to a deterrent? Which are incorrigible and need permanent non-penal segregation? Which, if any, should be destroyed as too dangerous to exist? How can the reformable criminal best be trained? And, above all, how well can we treat our children to prevent the development of the criminal mentality? What we want to find out and practise is what works with human beings to prevent crime, and not who is to blame. And, free will or no free will, M'Naghten Rules or not, I suspect that what works best will be found to be that which is most consistent with humanitarian and truly Christian principles.—I am, etc.,

London, W.1. FELIX BROWN.

SIR,—It is ironic that this age, which has demonstrated practically that atoms are disruptible, and are therefore not atoms, prides itself on calling itself "the atomic age." Dr. Eliot Slater's article (*Journal*, September 25, p. 713) provides similar cause for ironic reflection. We live in an age in which scientists have put forward principles of indeterminacy; astro-physicists have taught creation out of no matter, so that the old postulate of the indestructibility of matter has gone by the board; and other physicists teach that causal laws are no more than statistical averages; an age in which results by statistical methods, which were to yield indubitable results, since they eliminated subjective bias, are continually being objected to because the selection of facts depended on the taste and fancy of their selectors; and an age in which logicians of chance are beginning to doubt whether the human mind can ever determine accurately a normal trend or sequence so that we can know that past departures from it must be made good in the future. It is not true that all theory is against free will, as Dr. Johnson said. Dr. Johnson was outside the main stream of Western culture. From Aquinas to Maritain, and for a thousand years before Aquinas Western philosophers have offered rational arguments for the freedom of the will. It is significant that the latest form of Asiatic barbarism is rigidly determinist in its metaphysics and sociology, while it continues to scream moral reprobation against those who are not completely enslaved to these doctrines. So it avoids reasoned argument to persuade its victims rationally but uses methods of violence to condition and compel their will.—I am, etc.,

Rushden, Herts. E. H. STRANGE.

SIR,—The reaction of Dr. A. P. Camilleri (*Journal*, November 13, p. 1165) to my argument on free will is precisely that of my late headmaster, who told me I was both stupid and wicked to have thought of it, but omitted to point out a logical flaw. Let me give a version which I hope will not arouse the *odium theologicum*, and which seems to me to go close to an experimental proof of free will. By feeding all available information into an "electronic brain" it would be possible to predict with considerable accuracy which hand a man would use to pick up a penny. But if the subjects are informed of the prophecies of their fate the machine can be made to fail in every case. Q.E.D.—I am, etc.,

London, W.1. DENIS BROWNE.

Prevention of Colds

SIR,—However reluctant I may be to enter this controversy, I obviously cannot ignore the challenge offered by Dr. C. Dickson (*Journal*, November 6, p. 1108). First of all, I would make it clear that I have not been concerned with research into prevention of colds, although I have had ample experience in the epidemiology and control of infectious diseases generally. My work on the chemical disinfection of air[1] had a specific end in view—i.e., to find out whether, in buildings where one had control of the ventilation, it would be possible to maintain the bacterial content of the air at a low level. The experiments were largely academic experiments in applied bacteriology, albeit perhaps the largest-scale experiments of their kind ever published. I was able to show that, under certain controlled conditions of temperature, relative humidity, and air flow, hexylresorcinol produced air sterility in the most dramatic way—i.e., when introduced in a concentration of between 6 and 7 μg./cubic ft. of air (210 and 250 μg./cubic m.) the bacterial count was reduced from nearly one million organisms per cubic ft. (35 million per cubic m.) to fewer than 10 (350 per cubic m.) in 35 minutes.

The temperature of vaporization of the hexylresorcinol is critical. At 126° C. the bulk of the particles disseminated are of a size of less than 1 μ, at which size they are unaffected by gravity, and on account of mutual repulsion disperse rapidly throughout the atmosphere. The action is maximal against the smaller bacterial particles, which in an atmosphere of this kind may be the most dangerous because they remain airborne almost indefinitely. In my conclusions I stated: "Even should chemical air hygiene prove ineffective in the control of common ailments there may be a place for it in some specialized branches of medical practice. Places that immediately come to mind are operating theatres, the wards of infectious diseases hospitals and sanatoria, bacteriological laboratories and practitioners' waiting-rooms during epidemic times."

A good deal more work requires to be done. I myself was unable to carry the laboratory experiments into the field because my duties in the Royal Air Force took me to the Middle East, from where I have only recently returned. However, in view of the evidence produced by Dr. Dickson and despite that of Drs. Lidwell and Williams (*Journal*, October 23, p. 959), I have seen nothing which would persuade me to alter the above opinion. We all appreciate the many and vexing problems which abound in the field of research into the common cold. Nevertheless, I think that, in view of their positions in the M.R.C., Dr. Lidwell and Dr. Williams should not have published their paper on hexylresorcinol in the form in which they did, giving the impression that they had conducted a serious trial on an alleged new technique of air hygiene, found it wanting and fit only to be discarded. And for these reasons: They vaporized the hexylresorcinol at 116° C. instead of 126° C., giving inadequate dosage and presenting the chemical in the wrong particle size. There was apparently no attempt at control of ventilation or airflow. The whole experiment appears to depend largely on the evidence of a nurse who once a week asked the workers concerned the question, "Have you got a cold?" And, lastly, air samples were taken *only four times* during the winter, providing, surely, very scant information for subjection to statistical analysis. Obviously if you protect either workers or schoolchildren only at work or in the school you will not prevent them from catching colds. But if you can protect them for eight hours in the day, and for the eight hours, at that, when they are subjected to maximum risk, surely this is a step in the right direction.—I am, etc.,

Salisbury. IAN MACKAY.

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The Amsterdam Experiment

SIR,—The enterprise and initiative of Dr. A. Querido in establishing a system of social psychiatry for the city of Amsterdam (*Journal*, October 30, p. 1043) cannot fail to command admiration; but it should be realized that this is an experiment in a country whose psychiatric services were relatively unsophisticated and that the conditions in England are very different. The fact that Dr. Querido's methods have received such publicity and, in some quarters, enthusiastic support urges me to point out some of the dangers inherent in the scheme, and at the same time to indicate the facilities available for the diagnosis, investigation, and treatment of both mental illness and mental defect, which are perhaps at a higher level in this country than anywhere else in the world, not excluding the United States.

So far as could be judged from Dr. Querido's lecture at the Senate House of London University very little attempt is made in Amsterdam to differentiate between mental illness

and mental defect, and it seems almost certain that both types of patient are accommodated in the same hospital. It would be interesting to know what proportion of the "3,000 adult mental patients" under domiciliary supervision are mental defectives. One suspects that the number is fairly high. If the experiment were confined only to mental defectives there would be little to be said against it, though even here many feeble-minded patients benefit to an enormous extent by the training which can only be given in a well-organized hospital. So far as mental illness is concerned, however, it seems to me that the Amsterdam scheme is fraught with danger, and the relegation of diagnosis to second place or even worse might well mean that many early schizophrenics or mild depressions would escape treatment until it was too late. The view that admission to a mental hospital is tantamount to a life sentence is one which we are only now beginning to overcome. To put this idea back into the public mind by suggesting that it is "an admission of failure," as was stated in a recent letter in *The Times*, is a most dangerous and retrograde step.

It is true that many of our mental hospitals are overcrowded and that some have waiting-lists for admission, but for this very reason very few patients are admitted who could be satisfactorily treated in their own homes. Since the inception of the National Health Service there has been a considerable increase in psychiatric out-patient facilities (not mentioned by Dr. Querido), and in some regions psychiatric units have been established in general hospitals where intensive treatment can be carried out and the patient returned to an active working life in the shortest possible time. Several regional hospital boards are taking steps to provide day hospitals, psychotherapeutic social clubs, and, in collaboration with local authorities, generally to increase the social services; while domiciliary visits by psychiatrists, often assisted by psychiatric social workers, are freely available. There is a great need for extension of existing facilities for the care of mental defectives and the aged within the community, and if Dr. Querido's visit does something to stimulate the authorities concerned to develop these services it will prove invaluable, but I think it is vitally important to distinguish between the various aspects of the mental health service and not to do or say anything which might discourage patients or their relatives from accepting treatment in a mental hospital in the earliest stages of mental illness, if and when this is considered necessary.—I am, etc.,

London, W.1. J. C. SAWLE THOMAS.

Cyanacetic Acid Hydrazide

SIR,—In the *Journal* of July 31 (p. 301) Miss Margaret Barnett and others discussed the antituberculous activity of cyanacetic acid hydrazide. Although experimental details are not given, it seems that they should be in accordance with those published by us.[1] However, we disagree with their conclusion, "It appears that the indiscriminate use of the new drug may well have the danger of building up a population of patients with isoniazid-resistant strains."

It is well known that every antituberculous drug promotes the formation of resistant mutants. We believe, therefore, that the statement of Miss Barnett *et al.* would be valuable only if cyanacetic acid hydrazide could be proved to be inactive in the treatment of human tuberculosis, which is far from being true. In fact, the reason why the use of the hydrazide had been recommended was the splendid results obtained by its use in human therapy, not because of the experimental results. Clinically it has always proved to be of much value in spite of the fact that it has been tested by some investigators[2–7] on patients already resistant to I.N.H., to P.A.S., and to streptomycin. Although it is generally admitted that experimental and clinical activities of drugs are in a close parallelism, several cases of disagreement are known. And one of them is the case of cyanacetic acid hydrazide, a substance showing reduced experimental action but high therapeutic value in human clinics.

On the other hand, the fact of the development of I.N.H.-resistant strains does not seem to constitute any serious danger in clinics. It has repeatedly been proved that I.N.H.-resistant strains are much less virulent than the I.N.H.-sensitive bacilli[8–13] up to the point that the possibility of using resistant strains for vaccination has been shown experimentally,[14] with much the same success as that obtained when B.C.G. strains are employed. The development of crossed resistance between I.N.H. and cyanacetic acid hydrazide agrees well with our theory that what is really fundamental in antituberculous action is the identical interatomic distance existing between nitrogens in each of the drugs. The said crossed resistance seems to be a matter of controversy. Oker-Blom and Riska[15] state: "No agreement between the sensitivity of the cultures to I.N.H. and C.A.H. could be demonstrated, except in three cultures."—We are, etc.,

F. G.-VALDECASAS.
F. CALVET.
P. P. MUSET.

Barcelona.

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Toad Supply

SIR,—In view of certain correspondence in one or two of the national daily papers and in particular a recent front-page article entitled "Toad Supply Gives Out," which appeared in the *Manchester Guardian* of November 6, I would like to reassure those practitioners, clinics, and hospitals who normally make use of this laboratory that we have not closed down or curtailed the services provided in any way. A statement to this effect was made without our knowledge and is completely untrue.

This laboratory has provided a continuous service since its foundation by Professor F. A. E. Crew in 1929; some of your older readers will remember the first annual report published in 1930[1] and a more recent report by Landgrebe and Hobson.[2] Since the rehousing of the laboratory in 1948 and the change-over to the South African clawed toad, *Xenopus laevis*, as the test animal we have done more than 162,000 tests. We have also undertaken to do those tests normally done by the Sheffield Centre, which has unfortunately been closed—I am, etc.,

Edinburgh, 9. B. M. HOBSON,
Scientific Director,
Pregnancy Diagnosis Laboratory.

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Tympanic Membrane Perforation During Anaesthesia

SIR,—Dr. J. K. R. Whittingham (*Journal*, October 23, p. 969) has rendered a service to anaesthetists by reporting the case of perforation of both tympanic membranes during a form of anaesthesia which has yet another objection in addition to the rare danger reported. I refer to the driving of anaesthetic gases into the lower alimentary canal when sufficient pressure is generated under the face mask to respire the patient. There is present, always, the danger of anaesthetic gases entering the lower gut, and it has to be admitted that this does happen quite frequently. In spite of the fact that a cuffed tube is not without its own difficulties and dangers, its use is to be preferred to the face mask airway and open endotracheal set-up. With the cuffed tube the danger of air getting into the gut and the rare aural complication can be avoided, provided that very gentle pressure is used to oxygenate the patient following the succinylcholine and insertion of the tube.—I am, etc.,

Cambridge. HARRY RICHARDS.

Appendicectomy in Chronic Appendicitis

SIR,—I must reply to Dr. W. N. Leak and Mr. J. A. Macfarlane (*Journal*, November 6, p. 1109), who have both indulged in misplaced vituperation when criticizing my letter (*Journal*, October 23, p. 991) about the justification for appendicectomy in chronic appendicitis. Dr. Leak, despite his scientific training, assumes that I do not believe that about 80% of the patients were relieved of the symptoms for which the operation was performed. I said nothing of the sort, but I did point out that similar investigations have produced widely divergent figures, a fact that merits interest, at least. I doubt whether treating the patient in an "impersonal, semi-contemptuous, sausage-machine-like way" has anything to do with the question, nor am I sure at whom this invective is directed. Mr. Macfarlane produces his argument in a much more reasonable way, but assumes, for no apparent reason, that those who are unwilling to remove a normal appendix subsequently wash their hands of the patient. Personally, I very much resent this unwarranted accusation, as I can assure him that I consider it my duty to discover the cause of the patient's symptoms, and, if I fail in this, to find someone else who can. Neither Dr. Leak nor Mr. Macfarlane makes any suggestion as to the diagnosis in 10% and 20% respectively of their patients whose symptoms persisted after laparotomy, although this seems to me to be a most important point.

I entirely believe that a large percentage of patients are, at any rate temporarily, relieved of their symptoms by appendicectomy, but I deny that chronic appendicular disease exists. This opinion seems generally held, and it is about time that this vexed question had a little more light thrown on it. It is very disheartening to look back on the number of patients I see (and I have no reason to think that others' experience is different) who have had a "chronic appendix" (horrible term) removed many years previously, whose symptoms have persisted or recurred after an interval, and who have then had operations for "adhesions" or numerous investigations without any pathological lesion being found. I am aware of the difficulties of being a purist in this matter, as any patient with an appendix can obviously develop acute disease of the organ, but this should not prevent one from pursuing the ethically correct course.—I am, etc.,

Farnborough, Kent. D. P. VAN MEURS.

Sterilizing of Thermometers

SIR,—With regard to Dr. R. A. O'G. Pearson's letter (*Journal*, October 23, p. 994) concerning the sterilization of clinical thermometers, I should like to make the following observations. Two factors have to be taken into consideration—the efficiency of the method and the effect it will have on the numbering and graduation marks on the thermometer. There are plenty of antiseptic solutions such as lysol, choloroxylenol, phenol, etc., which will give complete bacterial safety, but which never fail to dissolve the numbers from the average clinical thermometer. For desk use in the surgery, undoubtedly the best solution is liquor boracis et formaldehydi, as this is an effective disinfectant and has no effect, after prolonged use, on the lettering of even the cheapest clinical thermometer. My practice is to keep the thermometer standing in this solution, to wipe it with cotton-wool before use, then to wipe it with cotton-wool dipped in spirit after use to remove the mucus and debris and then to return to the solution. It is essential that the height of the container and the level of the solution therein should be adequate and reach to within ¼ in. (1 cm.) of the top of the thermometer. For this reason topping-up should be done daily, as evaporation in a warm surgery is fairly rapid.

With regard to sterilizing thermometers when visiting, it would appear that the best practice is to take all temperatures in the axilla and to keep the thermometer in either isopropyl alcohol or 70% ethyl alcohol, in a suitable spirit-proof case. If oral temperatures are to be taken the thermometer should be wiped with cotton-wool prior to use and then wiped again after use with cotton-wool saturated in 70% ethyl alcohol, which can be carried in a spirit bottle. This is my standard practice and I do not think I am responsible for any cross-infection. Rectal temperatures would constitute a different problem, requiring a much more elaborate technique. In cases of tuberculosis it would be necessary for the thermometers to be washed in 5% cresol, then thoroughly rinsed and stored in liquor boracis et formaldehydi. Incidentally, liquor boracis et formaldehydi has been recommended in memorandum No. 11 of the American Research Council on the *Control of Cross Infection in Hospitals*.

If a very infectious case has been dealt with I feel that the best thing is to give the thermometer a good scrub in soap and water before returning it to any sterilizing solutions. This is probably the most reliable method of *rapid* sterilization there is.—I am, etc.,

Sheffield, 8. E. C. ATKINSON.

Toxicology of Dextran

SIR,—I agree with most of Dr. George Discombe's logical rejoinder (*Journal*, March 6, p. 581) to questions I raised about the safety of dextran infusion (*Journal*, February 6, p. 332). I must take some exceptions, however. For example, Dr. Discombe, while admitting my point that *in vitro* incompatibility could be demonstrated frequently between dextran and erythrocyte suspensions, waives this as a purely theoretic objection to proceeding with the infusion. I dispute this point on the ground that we do rely on such *in vitro* testing to adjudge blood compatibility. It is our main practical indicator for the likelihood of infusion reaction. To me it would seem indefensible to put something into a recipient's circulation which had demonstrated its ability to agglutinate his red corpuscles.

Most transfusionists now agree that the ordinary "cross-match," employing washed erythrocyte suspensions in saline, is not a sufficiently sensitive indicator for the likelihood of intravascular agglutination and have adopted fortification techniques to elicit tendencies toward covert incompatibility. These techniques employ a conglutinative material, invariably a macromolecular colloid such as bovine albumin, modified globin, P.V.P., gelatin, or, ironically enough, dextran itself.

Contrary to an inference that I must inexcusably have left with Dr. Discombe and other readers by my original letter—that I am primarily a theoretician—I have been a practising transfusionist for over 20 years. I cannot judge my own competency during that time, but as technical director of the Cook County Hospital Blood Bank, the first in this country, for the first five years of its operation I was inevitably involved in many transfusions. This involvement has been the more intimate, since any patient for whom I order blood, plasma, or an oncotic substitute has medical attendance during the first 30 minutes of the infusion. In my own patients I am that attendant, and this experience has permitted my speaking rather authoritatively on the pernicious aspects of American transfusion practices.[1 2]

As blood research officer during world war two military service, I crystallized an opinion that our pooled plasma was responsible for more deaths than lives actually saved through its use, and set myself to find out why. The results of this investigation bear on the dextran problem, for the invidious mechanisms are common to both. For, although the icterogenic propensities of our pooled plasma are cited as reasons for finally discarding it during the Korean campaign, there is an even more dangerous resultant from the mixing of colloids in the recipient's circulation. This is no matter of pure hypothesis, and, where I have previously cited a certain haemagglutinative mechanism to illustrate a specific instance of fatal reaction to plasma,[1] I have since seen a similar one of immediate collapse on commencing 6% dextran infusion, in which I was able to aspirate "sludged" blood from the effluent vein and then to demonstrate that this particular recipient's erythrocytes were immediately agglutinated by even a 1% concentration of the same dextran. A prior *in vitro* test would have averted trouble.

No transfusionist can ignore the wide implications of a literature growing up around so-called "aggressin" effects of

dextran and other mucoid colloids liable to exist in transfusion systems. The admitted transfusion refractoriness of subjects with advanced adaptation diseases (leukaemia, disseminated lupus, gastro-intestinal neoplasms, haemolytic anaemia) is due to abnormally high concentrations of circulating plasma "transport" mucopolysaccharides ("mucoproteins") which have arisen through the disequilibrium of the hyaluronidase system characterizing these diseases. Temporary normalization of that system by cortisone accounts for the latter's ability to curb transfusion reaction and constitutes only one practical point resulting from an understanding of basic mechanisms. All median molecular weight mucoids may act, unpredictably, as either direct haemagglutinins, or as conglutinins which will reinforce the action of sublimal concentrations of specific haemagglutinin liable to be present in a transfusion system.[3] This, like reticuloendothelial blockade, is a general property of aggressins.[4] And, while there is a certain narrow polymer dispersion range of either dextran or P.V.P. at which this conglutinative and aggressin effect is minimal, it has never been absent from those available infusion lots I examined. Gillman's group[5] found a British product to have activity I would classify as that of an aggressin.[6] The term has evidently long been accepted as characterizing dextrans. My response to Dr. Discombe's comments was delayed pending formal presentation[7] of a possible concrete contribution to this pressing problem.—I am, etc.,

Laurelton, N.Y. R. D. BARNARD.

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Household Hazards

SIR,—Several correspondents have drawn attention to the dangers of coal-gas in the home, and it now seems pertinent to mention another hazard with which our medico-legal colleagues are well acquainted—namely, the wrongly connected electric fire. One has only to see the crowds surrounding the electrical fittings counters of popular stores to realize the probable magnitude of this danger to life. It is amazing how few amateur electricians realize the importance of making sure that the red live lead and not the black neutral one is connected to the switch of the three-pin outlet, and how easy it is to check that this has been done in an established fitting. The method consists of wiring an electric lamp to the "live" and "earth" terminals of the plug. If the lamp lights up when the current is switched on, then the live lead is correctly placed. If the lamp does not light up, the point is dangerous.—I am, etc.,

Godalming, Surrey. W. K. TAYLOR.

Polythene Tubing for Intravenous Infusions

SIR,—I have not seen described elsewhere the following simple connexion which is easily fashioned from materials readily available in most hospitals, and which, since it enables even relatively viscous fluids such as blood or plasma to be administered through a polythene tube of narrow calibre (bore 0.5 mm.), facilitates and encourages the use of polythene tubing for intravenous work.

Hitherto, without using a special connector, it has been necessary to connect such fine tubing to the remainder of the drip set by inserting an even finer needle into the lumen of the polythene, thereby reducing the rate of flow to such an extent that the infusion of viscous fluids was rendered impracticable. I have found, however, that such tubing is adequate when the following connexion, which ensures a lumen of at least 0.5 mm. diameter throughout the infusion system, is used. It depends on the fact that a fine polythene tube will stick, using finger pressure only, to the inner wall of a larger polythene tube, and the degree of cohesion thus obtained between the two tubes will even resist, should it prove necessary, the distractive force provided by positive pressure infusion.

Materials required are as follows: (1) One No. II serum needle (external diameter of shaft 1 mm.) with the shaft shortened to 1.5 cm. (an ampoule file will cut it). (2) A 2.5 cm. length of polythene tubing of 1 mm. bore and 0.5 mm. walls—that is, 2 mm. overall diameter. This tubing is now threaded over the shaft of the above needle, and will be found to fit tightly. The distal end of this tubing is then bored out for about 1 mm. —for example, by rotating it on the point of a No. 11 Bard-Parker blade—to give it a "blunderbuss" mouth. (3) A 10 cm. length of polythene tubing of 0.5 mm. bore and 0.25 mm. walls —that is, overall diameter 1 mm.—is then taken and will be found, when pressed into the bored-out end of the larger tubing, to effect a strong and waterproof joint at that point, without materially restricting the bore of the narrower tubing.

Any ordinary blood transfusion needle through the lumen of which the narrow polythene will just pass with ease serves as the introducer. For use, the drip is set up in the usual way, the introducer being removed speedily and easily by successively disconnecting the polythene joint above described, sleeving the introducer out of vein and skin over the tubing, and re-connecting the joint. Sterilization in 1% cetrimide solution has proved satisfactory.

This assembly has been used frequently in both the United Kingdom and Sierra Leone since 1951, and has, in my experience, proved especially useful in the circumstances which sometimes obtain in the latter country, where trained nursing staff are not always available.

I am indebted to the Honourable Director of Medical Services, Sierra Leone, B.W.A., for permission to publish.—
I am, etc.,

Sierra Leone, B.W.A. J. D. MACGREGOR.

St. John's Hospital, Lewisham

SIR,—Previous correspondents (Mr. H. P. Winsbury-White (*Journal*, October 2, p. 811); Dr. F. F. Cartwright and Dr. Charles Beney (October 16, p. 931); and Mr. Kenneth Wilson (November 6, p. 1108)) have referred to the threatened future of St. John's Hospital, Lewisham. This general hospital has served the area for decades. It is a small but highly efficient unit, and, with Lewisham Hospital, it still gives the area the promised free choice of consultant. It is easy to destroy, but difficult to create: to dismember St. John's into a specialized hospital without full ancillary services would appear to be an irresponsible destruction of a tradition and service which is widely recognized. To make it a surgical hospital, for which it has limited facilities, with open-air access from the theatre to most of the wards, is beyond comprehension.

Plans to extend the hospital on this healthy hillside site were prepared long ago—the building ground is there, and it might be cheaper than the demolition and subsequent rebuilding of the old L.C.C. hospital at Lewisham. By preserving St. John's in the present nursing shortage, recruitment to a hospital with the background to which Dr. Cartwright referred would still be easier than to other hospitals in the group. It would certainly not be so if St. John's ceased to be a general hospital.

Mr. Wilson refers to the spacious amenities of the Park Hospital, but in the regional plan this is to be kept as an emergency isolation hospital for epidemics. As such it might, in present circumstances, lie idle, but it could be equipped to serve as an overflow hospital at limited expense. In due course St. John's could probably provide some of the nurses, and the Park could take many of the patients from St. John's, where the out-patient attendances are disproportionate to the beds available. One of the reasons given for the limited utilization of the Park Hospital is the current nursing shortage, but this may be partly cause and effect. A white elephant standing by for emergencies would still have to face the same problem—and in an emergency. If it were now established as a working unit, it could be quickly switched over to epidemic problems when required. Whether

an E.N.T. department is a suitable specialty to be housed in an infectious diseases hospital is debatable, but with the provision of a suitable theatre and ancillary services it could deal with much of the surgical waiting-list and could provide beds which are so urgently needed in the group for general medicine and many specialties.—I am, etc.,

London, W.1. DAVID ERSKINE.

Antihistamines and Urticaria

SIR,—I should like to record the following case of an acute urticarial reaction promptly relieved by an antihistaminic compound.

A 30-year-old woman, who had been receiving psychiatric treatment at our polyclinic, was given 1 ml. of a vitamin B complex preparation intravenously. In about two minutes she developed an acute generalized erythema and urticarial elements were evident after five minutes. An intense feeling of heat, associated with a compulsive itching of the cheeks, legs, and abdomen, was reported by the patient. Her lips swelled and the conjunctivae were hyperaemic. She also reported a pulsating headache. 10 ml. of calcium gluconate were administered immediately, but this served only to increase the feeling of heat.

About half an hour after the administration of the vitamin B complex, 1 ml. of antazoline ("antistin") was given slowly intravenously for a period of five minutes, during which time the patient became free of itching and felt cool. The "heavy feeling" of lips and eyes disappeared and the hyperaemia of the conjunctivae almost vanished. Gradually the erythema decreased, the papular elements over the legs bleached, and there remained no sign of any allergic manifestation after 25 minutes.—I am, etc.,

Asfuriyeh, Lebanon. A. S. DROOBY.

Thyroid Retractors

SIR,—I have just had the following letter from N. M. Peryer, Ltd., of Christchurch, New Zealand, makers of the thyroid retractor which I attempted to imitate and describe in the *Journal* (June 5, p. 1319), and I feel it would be fair to them to reproduce it in your correspondence column, as I know some of your readers have been interested in these retractors.

"We have read with great interest your article in the June 5 issue of the *British Medical Journal* regarding the thyroid retractors which you used during your visit to the Wellington Hospital.

"About the year 1930 the late Dr. Hayes, an anaesthetist, brought two sets of these retractors back with him from a trip overseas. He presented one pair to Sir Hugh Acland, F.R.C.S., and the other pair to L. A. Bennett, Esq., F.R.C.S., both of Christchurch. Mr. Bennett was kind enough to lend us his pair for a short time and our instrument maker copied them. Since then we have sold hundreds of pairs and to-day they are widely used, not only for thyroids, but for other surgical conditions. We understand their correct name is 'the Swedish Hospital Minnesota Retractor.'"

—I am, etc.,

London, N.W.8. HENEAGE OGILVIE.

Infantile Scurvy

SIR,—The report of cases of infantile scurvy by Drs. Gwyn Howells, P. E. S. Palmer, and W. H. St. John-Brooks (*Journal*, November 13, p. 1143) is timely and of great interest. They quote H. C. Cameron's statement that "in its grosser manifestations [scurvy] may be said to have ceased to exist" and conclude that it is untrue. The important point is that when made, as it was in 1941, it was true, but in 1954 it does not seem to be true. In the Birmingham Children's Hospital it has been usual to see one or two cases of infantile scurvy a year, but during the past 12 months we have seen seven cases. At the same time, we have seen an increasing number of cases of nutritional anaemia in infants and young children—another condition which had almost ceased to exist. It would be interesting to know whether deficiency disease is occurring in other parts of the country. If so, then what changes are taking place in the social services concerned with preventive paediatrics which may be responsible, or what other explanation may there be?—I am, etc.,

Birmingham. FRANCES BRAID.

An Infant's Dental Chair

SIR,—We note with interest Dr. Victor Goldman's article and illustration (*Journal*, October 23, p. 985) on the subject of "An Infant's Dental Chair." For the past twelve months we have been using a similar but, we think, a more adequate appliance. It is identical with Dr. Goldman's model, but has in addition a miniature steering wheel, which prevents the infant from sliding forward off the seat. Further, the highly coloured driving wheel helps to distract the infant's attention during induction and is equally useful in the return to consciousness stage. A young lady from a local motoring establishment is responsible for this most useful innovation.—I am, etc.,

PAT BYRNE.
FRED FARMER.

London, S.E.24

B.M.A. Library

SIR,—This letter is sent in order to express my appreciation of one of the valuable privileges of membership of the British Medical Association—namely, that of the library service, which is provided for all members of the Association, not merely to those residing in London or within easy reach of Tavistock Square. By means of the postal service books are available to all members, and a skilled librarian will select if requested, and have sent on to any member, wherever he or she may reside, recent textbooks and reference books on the particular subject or subjects on which information is desired, and this selection and advice seem to me to be the most valuable part of the library service.

Let me illustrate my own personal experience. Having developed a cardiac disability, a neighbouring colleague sent me to a cardiologist for his opinion on my disability. *X*-ray screening and a series of electrocardiograms were taken, followed by a learned disquisition on my condition. Some of this advice I grasped, some I didn't, I being an older man who was not trained in the modern details of cardiology. This caused me to seek the help of the B.M.A. Librarian, to whom I applied for assistance. Within three days I received by post White's *Heart Disease*, 4th edition, and accompanying it Graybiel's *Electrocardiography in Practice*, 3rd edition. As this letter contains several personal details, I sign myself

APPRECIATIVE MEMBER OF THE B.M.A.

War Memorial Dedication

SIR,—May I be allowed to express in your columns my deep impression of the profoundly moving ceremony which took place in the Court of Honour on November 2, the commemoration of All Souls? I feel none who was present can fail to have been struck by the beauty and dignity of the service so beautifully put together. The accompaniment of the hymns and tasteful renderings before the service by the R.A.M.C. band were extremely sympathetic. The hymns were so suitable, and that composed for the occasion was really a gem of poetry. The fanfares and eloquent address of the Archbishop, and seraphic ascription by the choir, were highlights of the service.

One felt all present were indebted to the officers of the B.M.A. who arranged the programme of proceedings. The War Memorial itself is a masterpiece of sculpture and those now in the church triumphant are most fittingly commemorated. All Souls' Day will thus live long in the memory of us who were privileged to be present.—I am, etc.,

Redhill. J. B. GURNEY SMITH.

Obituary

W. B. ANDERTON, M.B.

Dr. W. B. Anderton, consulting pathologist to Manchester Royal Infirmary, died on November 10 at the age of 82.

William Bury Anderton was born on July 27, 1872, and was a medical student at Owens College, Manchester, qualifying M.R.C.S., L.R.C.P. in 1898 and taking the London M.B. in the following year. After holding resident posts of house-physician at Manchester Royal Infirmary and medical officer at Manchester Union Infirmary, Crumpsall, he turned his attention to pathology and was appointed pathological registrar at Manchester Royal Infirmary and lecturer in the University of Manchester, where he was curator of the pathological museum for some years. He continued in active work at the Infirmary for thirteen years until 1915, when he was appointed honorary pathologist. He possessed a clear and precise mind, and his extensive experience of post-mortem work gave him an invaluable knowledge of the changes which take place in the body as the result of disease. His demonstrations to students were lucid, and his lectures, which were full of human interest, were among the brighter hours of the systematic teaching of medicine. His long experience in examining the cause of death from poisons, wounds, injuries, and other unnatural causes led to his appointment as lecturer in forensic medicine in the university, a post he held until 1938. He was also an examiner in forensic medicine for the universities of Manchester, London, and Liverpool. Dr. Anderton had a great fondness for music, and could play the piano well enough to please his friends and to amuse himself. A born storyteller, "Andy," as he was affectionately known to generations of students and to his friends, was a most popular speaker at student and other gatherings, and no one enjoyed the humour of an incident more than he did.

AUGUSTE ROLLIER, M.D.

The obituary of Dr. Auguste Rollier was printed in the *Journal* of November 13 (p. 1169). We are indebted to Dr. ANDREW MORLAND for the following appreciation:

Dr. A. Rollier, when I knew him in the early 1920's, was a large, vigorous, middle-aged man who already had a world-wide reputation for his *cure de soleil* at Leysin. As a pupil and assistant of Kocher in Berne he had seen the rapidly increasing inroads of surgery in non-pulmonary tuberculosis which, in the early years of the century, had become so extensive that the term "surgical tuberculosis" was in general use. Personal experience and, in particular, the sad fate of a close friend who had died from generalized tuberculosis after a series of excisions led Rollier to react violently against the current practice and to return to the idea of general treatment for a general disease with local manifestations. The illness of his wife caused him to give up work in the capital and settle in the high Alpine village of Leysin, where he started his first clinic for the conservative treatment of non-pulmonary tuberculosis. Impressed by the action of sunlight in promoting the healing of wounds, Rollier began to expose his patients by gradual stages to the rays of the sun. Improvement in general health was remarkable and the lesions commonly followed suit.

As in the case of most healthy reactions in medicine, Rollier's revolt against wholesale excisions went too far in the opposite direction. He left everything to sunlight and rest; many good results were undoubtedly obtained, but in other cases, such as the synovial type of knee-joint tuberculosis and in infections retarded by the presence of sequestra, which Rollier liked to see gradually extruded through a sinus without any human aid, the patients tended to take an unconscionable time in healing.

At this time he had charge of more than 1,000 patients scattered about Leysin in about 40 separate clinics, so that his routine visits to each only took place every six or eight weeks, and were, naturally, a ceremony of some importance. Rollier's almost religious enthusiasm for nature's method of curing tuberculosis by sunlight and fresh air infallibly made him the high priest of a cult with disciples all over the world, and visitors to Leysin were numerous. Although an enthusiast, Rollier did not enjoy the role of a showman, since he was by nature so shy that the prospect of an after-dinner speech would spoil his meal to such an extent that he frequently adopted the practice of getting his "toast" over with the soup. When asked by a British orthopaedic surgeon if he really thought the sunlight apart from the rest and fresh air was of any importance in treatment, he replied disarmingly, "What can I say? Je suis marchand de soleil." In the month of October Leysin did not see Rollier for several weeks, as he retreated to the High Alps to hunt chamois, a tough life which I believe he enjoyed more fully than the fame and adulation that surrounded him at Leysin.

F. W. GOYDER, M.B., F.R.C.S.

E. D. I. writes: May I as an old colleague and friend add a small tribute to the memory of Mr. Frank Goyder, whose obituary was printed in the *Journal* of November 13 (p. 1169)? No one could have been less concerned about material rewards or personal prestige. His open and direct simplicity was a constant refreshment. He believed in preventive medicine and was a good friend to the school health service. In private life he was friendly, unassuming, and sincere. His widow and children must have proud memories.

Dr. MARY I. HEMINGWAY-REES died on October 4 at the age of 67. Mary Isabel Hemingway was born at Melton Mowbray, Leicestershire, on September 10, 1887, the daughter of Charles R. Hemingway, C.B.E., J.P. After leaving Cheltenham Ladies' College she studied medicine at the universities of Edinburgh, Glasgow, and Birmingham, qualifying M.R.C.S., L.R.C.P. in 1914, and obtaining the Edinburgh degrees of M.B., Ch.B. seven years later. After qualification she held obstetric house posts at the Queen's and General hospitals, Birmingham, and then from 1916 to 1918 was resident medical officer at St. Chad's Hospital, Birmingham. After the end of the first world war she became interested in mental health problems, and joined the staff of the Tavistock Clinic. She married Dr. J. R. Rees, a member of the original staff of the clinic and for many years its director, in 1921, and he survives her, together with one daughter.

D. M. O. writes: The unexpected death, following a brief illness, of Mollie Hemingway-Rees came as a shock to her many friends in the medical profession. Her gay and gallant personality endeared her to all those who had the privilege of knowing her intimately. She was never defeated or discouraged by her physical disabilities, and her great gift for friendship and her interest in other people made her a delightful companion. As the wife of Dr. J. R. Rees, medical director of the World Federation for Mental Health, she used to the full her capacity for creating international good will. She was a most gracious hostess, and had the gift of bringing people together and making them feel immediately at home. She was a well-known and beloved figure in mental health circles all over the world. Those who were with her during the International Conference of the World Federation for Mental Health at Toronto in August found her, as always, vivacious and eager to participate in both the scientific and social activities. She was a keen

member of the Medical Women's Federation, and was chairman-elect of its standing committee on psychological medicine. She was an able psychiatrist in her own right, and succeeded in winning the confidence and affection of her patients and colleagues. She will be sadly missed by her many friends in all walks of life, but her wide circle will feel enriched by the happy memory of her bright spirit.

The obituary of Dr. H. H. SANGUINETTI was printed in the *Journal* of October 23 (p. 996). We are indebted to F. C. R. for the following appreciation : Harold Sanguinetti was a most attractive and versatile man and a great character, and his sudden death is an irreplaceable loss to a great many friends, and chiefly to the patients in his large Kensington practice, whom he served so selflessly that it is not surprising that he never became a rich man. As pathologist to the National Temperance Hospital and Belgrave Hospital for Children he was equally efficient and tireless. A witty speaker and writer, he was in great demand and always carried about him the aroma of Wadham College, Oxford, in the great days of F. E. Smith and Carson. In spite of his wit he completely lacked bitterness and was able to meet the shocks of a hard life with notable courage and a charming sense of humour. Thus James McClure, the surgeon who successfully removed a swelling in his neck in 1923, tells me that he vividly recalls Sanguinetti (who sectioned the tumour himself) looking down the microscope and calmly announcing, as it seemed, his own sentence of death with the words: "Yes, certainly a melanotic sarcoma." His son-in-law, Michael Newt, has written to me :

"It was perhaps typical of him that his D.M. in 1924 was a direct result of the operation for melanotic sarcoma he had had a year or so earlier. 'Well,' he explained, 'I thought that if I were going to die, I'd like to die an M.D.' And then and there he began writing his thesis while lying in his hospital bed."

Naturally he always had in view a possible recurrence, but a thorough examination and *x*-ray examination within three months of his death showed him clear of the disease. He actually died of a cerebral haemorrhage at the age of 82, having attended his patients all his last day. As a widower for 19 years he was fortunate in the loyalty and help of his daughters, Grace particularly, who now has the difficult task of transferring all his patients after his very sudden death. She has asked me to express her appreciation of the obituary notice in the *Journal* of October 23, but to say that the date of his birth was actually March 27, 1872, and that, though his mother was a Quaker, he himself was not.

Dr. ROBERT CUNNINGHAM, medical superintendent of Poole Sanatorium, near Middlesbrough, died suddenly on October 29 at the age of 59. He was a medical student at Glasgow when war broke out in 1914, and served from the outset as a combatant in the Worcester Regiment until, like others, he was sent back to complete his university studies. He graduated M.B., Ch.B. in 1916, and thereafter served with the R.A.M.C. in the African theatre of the war and later with the occupation forces in Germany. After demobilization he held a house post at Robroyston Hospital, where he probably first acquired the interest in tuberculosis which was to occupy the greater part of his professional life. In 1923 he obtained the D.P.H. at Cambridge. From 1923 to 1927 he was medical superintendent of Wooley Sanatorium, Northumberland, in succession to Dr. J. B. McDougall, and remained there until the outbreak of war in 1939. Dissatisfied with the conservative and palliative forms of tuberculosis therapy then the standard practice in this field, and increasingly aware of the prospects inherent in the active, largely surgical, methods being developed abroad and by a few pioneers in this country, Cunningham succeeded in obtaining facilities for this work and the co-operation of an interested surgeon at Wooley Sanatorium in 1933. It was typical of his enthusiasm that, despite the unsuitability in some ways of his sanatorium for such work, he obtained these facilities at a near-by cottage hospital, where a great deal of valuable work was and still is being done. Wooley soon acquired a considerable reputation through his successful efforts in promoting curative therapy. Some time before the last war it was decided to build a large modern institution—Poole Sanatorium, near Middlesbrough—for the treatment of patients with pulmonary tuberculosis coming from six municipalities in the north-east. Although the building had reached an advanced stage, work on it was stopped at the outbreak of war in 1939. Cunningham was mobilized as a reservist ; he went to France with the 1st Battalion of the Green Howards, later joining the staff of a general hospital at Dieppe. Meanwhile war conditions emphasized the completely inadequate facilities available for tuberculous patients in the Middlesbrough area, and it was decided in 1940 to complete the projected sanatorium. Cunningham's reputation and personality made him the obvious choice, and he was appointed as the first superintendent, being demobilized from the R.A.M.C. to resume his old work at Wooley and to take up his new duties. For a time he combined both appointments until, after about a year, a section of Poole was ready to receive patients. A Middlesbrough nursing-home had been transferred to a mansion close to the sanatorium, and Cunningham straight away was able to make arrangements for certain of the operative work to be dealt with there until the completion of the sanatorium's own theatre suite. For at least a year he carried the whole burden of the care of patients in over a hundred beds, as well as the administrative responsibility, the supervision of the building work, and the laying out of the grounds, etc.—no small task, especially under wartime conditions. But he was no stranger to hard work and took an active part in all that pertained to his specialty. A member of the British Tuberculosis Association, he served on its nursing training committee, being one of the association's examiners in the north-eastern region for many years. He was also a member of the hospital architectural committee of the National Association for the Prevention of Tuberculosis. At the time of his death he was the chairman of the Cleveland Division of the British Medical Association.

G. A. M. writes: As the Poole sanatorium was completed and its full complement of 320 beds became available, Cunningham was gradually able to obtain the assistance of a loyal staff. There was later expansion of the establishment under the National Health Service, but those fortunate few who were associated with him at Poole during the first seven years or so will always appreciate how much is owing to him. In addition to being a good clinician with a real flair for tuberculosis work, he was an admirable administrator for this type of institution. Robert Cunningham, handsome, charming, and of complete integrity, was a good mixer and a cultured, intelligent man of parts, as befitted a near contemporary of James Bridie and Walter Elliot at Glasgow. With his natural gifts, it was perhaps surprising that when starting his career he was prepared to devote himself to tuberculosis work. Possessing an enviable breadth of outlook, he had a great zest for life and a notable tolerance and understanding of the points of view of others—perhaps at times even allowing them too much consideration. To work with him was a privilege and an unqualified pleasure. He had his share of sorrow and disappointment but had a happy family life, and his unexpected death was a terrible loss to his widow, formerly Miss Helen Whyte, of Hexham, and to their two surviving sons.

Mr. ELLIS PEARSON, well known as a surgeon in North Devon and one of the pioneers in the use of *x*-ray apparatus, died at his home at Bideford on October 30. He was 85 years of age. Ellis Pearson was born at Aintree, Liverpool, on January 20, 1869, and was educated privately until he entered University College, Liverpool, as a medical student. He qualified by taking the Scottish triple qualification in 1895, and three years later he obtained the F.R.C.S.Ed. Before taking the Edinburgh Fellowship he worked for three years with Sir Robert Jones at the Royal Southern Hospital, Liverpool, where he attended

the first demonstration of *x* rays in the city. His interest in radiology, thus aroused, remained with him throughout his long life. He was one of the early members of the Röntgen Society, and in 1907 acted as one of the honorary secretaries of the Electrical Section—better known to-day as the Section of Radiology—when the British Medical Association held its Annual Meeting at Exeter in 1907. He read a paper before the Section on the use of *x* rays from the point of view of the general practitioner. After practising for a short time at Birkenhead and at Castletown, Isle of Man, he settled at Bideford in 1902 and speedily built up an extensive surgical practice. His outstanding abilities resulted in constant demands being made from over a wide area for his help in consultation. In addition, he acted as coroner for North Devon for 23 years and medical officer of health for Bideford for 41 years, holding both appointments until his death. The first child welfare clinic in the area, established on a voluntary basis, was one of his creations. A serving brother of the Venerable Order of St. John of Jerusalem, he took a great interest in ambulance work in the district. A member of the British Medical Association for nearly 50 years, he represented Barnstaple at the Annual Representative Meetings in 1907, 1910, and 1914 and at all three of the Special Representative Meetings held in 1911, and so had a grandstand view of the stormy discussions concerned with the provisions of the National Insurance Bill which became law that year. He was chairman of the Barnstaple Division from 1934 to 1936 and president of the South-western Branch in 1934–5. In spite of Pearson's busy professional life he found time for many sporting activities. As a young man he played Rugby football for Liverpool District and occasionally for Birkenhead Park; he was also an exceptionally good soccer player, as well as cricketer and oarsman. Bringing his Irish hunter, Lassie, down to Devon, he hunted until 1922. An original steward of the Pony Turf Club, he rode with much success in point-to-point races until concussion (and his wife's entreaties) induced him to desist. His was an indomitable spirit. At the age of 79, having lost three fingers of the right hand and one and a half of the left as a result of a severe *x*-ray burn suffered 20 years before, he took up carpentry, and in particular the making of toys and models, as a hobby. His genial personality will be sadly missed in North Devon. He is survived by his son, Charles, an orthopaedic specialist in the Royal Navy, and by his two daughters, his wife, formerly Miss A. E. Williams, whom he married in 1896, having predeceased him.—M. W. L.

The reputation of the Royal Schools for Deaf in Manchester stands high, and all those interested in the education of the deaf will have learnt with regret of the sudden death a few weeks ago of Mr. JOHN SPALDING. He had retired from the post of headmaster of the Royal Schools only six months ago, and was well known throughout Britain, but especially so in Manchester and the north-western region of England, for his wide knowledge about all that pertained to the education and training of the deaf. On such practical matters as the use of hearing-aids his advice was often sought by otologists and also by the Medical Research Council. Born in Lincolnshire in 1892, he became a pupil teacher at his own grammar school before joining the staff of the Manchester Royal Schools for the Deaf in 1911. After Army service in the first world war he returned to his old post and started lip-reading classes for deaf ex-Service men. In 1922 he married Miss Winifred Trigger, a teacher on the school staff. She was actively interested in the work he was doing and was a great source of inspiration and help to him during his long years of service. Shortly afterwards he was appointed master in charge of the James E. Jones School of Industrial Training, a position which he held until his appointment as headmaster of the Royal Schools for the Deaf in 1926. Among his many outside activities, he was a member of the advisory council on training of teachers of the deaf at Manchester University, and he organized the practical training of students. At one time he was chairman of the National College of Teachers of the Deaf, and held the position of examiner for the diploma examinations of the college. He gave free access to his institution, as well as advice, during the making of two films—*Education of the Deaf* in 1945, sponsored by the British Council, and the very popular film *Mandy*, of which many of the shots were actually filmed at the Royal Residential Schools. Mr. Spalding was particularly proud of the fact that the Manchester Schools were the only schools for the deaf providing vocational training after 16 years of age. In spite of great demands on his time, he was always willing to give advice and help to anyone interested in the problems of the deaf, both children and adults. He gave talks, and conducted tours round the various establishments under his control, to innumerable groups of teachers, students, nurses, and medical officers. He was particularly helpful during two recent years in making available all the facilities of his departments for two courses sponsored by the School Medical Officers Group of the Society of Medical Officers of Health on the ascertainment and education of the deaf child, and he himself took an active part in the instruction given. His untimely death will be a great loss to countless deaf people, and to many individuals and organizations actively interested in their welfare.—E. M. J.

Medical Notes in Parliament

INDUSTRIAL HEALTH SERVICE

The MINISTER OF LABOUR announced on November 11 his decision to stimulate the further development of industrial health services in workplaces covered by the Factories Acts.

These services, Sir Walter Monckton stated, included the provision of good environmental conditions at the place of work, of protection against industrial disease, of adequate medical and nursing supervision, and first aid. He was appointing a standing Industrial Health Advisory Committee, and was inviting the appropriate industrial and other organizations [including the B.M.A.] to nominate members.

He would carry out a review to ascertain where industrial health services most needed to be extended and promote surveys and field investigations to determine the need for preventive measures or research. The general aim would be, in close co-ordination with the preventive and curative health services provided by statutory bodies, to develop industrial health services on a voluntary basis.

Mr. M. MCCORQUODALE (Epsom, Con.) asked whether the plans had the support not only of both sides of industry, but also of the medical profession. Sir W. MONCKTON said that from the consultations he had had he could claim that, while there were differing views on how the difficulties ought to be tackled, all the organizations concerned, including the B.M.A., considered this a useful step forward and promised to co-operate.

Mr. A. BLENKINSOP (Newcastle-upon-Tyne, East, Lab.) asked for an assurance that there was no intention of perpetuating in isolation the industrial health service from the National Health Service but rather the encouragement of co-ordination and co-operation. Sir. W. MONCKTON said that nothing that had been done was more than a step forward. It did not prejudice what might be the final way of dealing with the matter on a national basis. He knew he could get the co-operation of the Minister of Health.

Identification of Babies

Lieutenant-Colonel M. LIPTON (Brixton, Lab.) asked the Minister of Health whether he would introduce a better system in maternity hospitals to ensure that newly born infants were not assigned to the wrong mothers. Mr. SOMERVILLE HASTINGS (Barking, Lab.) asked what the Minister was doing to restore the confidence of mothers

that when they left the maternity wards of hospitals they would take with them their own babies, in view of recent incidents.

Miss PAT HORNSBY-SMITH, replying on November 8, said it was a matter of great concern that any such mistake should occur, but everything showed that those which had recently been publicized appeared in each case to have been due to the human factor and not to defective systems of identification. The Minister had carefully considered the various suggestions made, but did not consider that central or uniform regulations would assist in preventing error.

Lieutenant-Colonel LIPTON said that slapping on a bit of adhesive tape was not very satisfactory as a means of identification. Was it not possible to devise a more foolproof method of avoiding these distressing cases? Miss HORNSBY-SMITH agreed about the distressing nature of these cases, but said they were very rare. Lieutenant-Colonel LIPTON: How do you know that? Miss HORNSBY-SMITH: Out of 350,000 cases a year the methods for identification are generally satisfactory. Investigations into the specified cases prove that, whatever the method of registration, these were errors of the human element and not ones that could have been anticipated.

Consultant and Specialist Services

The MINISTER OF HEALTH gave to Mr. A. BLENKINSOP (Newcastle-upon-Tyne, East, Lab.) on November 10 the following information about the number of full-time and part-time specialists serving in the Health Service at the end of 1952 and 1953 and at March 31, 1954, which was the latest available date.

	Dec., 1952	Dec., 1953	March, 1954
Consultants:			
Number employed whole-time	1,704	1,728	1,762
Total hours worked weekly by part-time consultants ..	106,000	109,889	112,003
Senior hospital medical and dental officers:			
Number employed whole-time	964	1,167	1,199
Total hours worked weekly by part-time staff	17,000	16,054	16,078

The numbers, he pointed out, excluded those holding honorary contracts, and the total hours of part-time work in 1952 were estimates. The March, 1954, figures were derived from limited returns.

1,000 More Doctors

Mr. G. R. MITCHISON (Kettering, Lab.) asked on November 10 how many doctors were serving in the Health Service, respectively, as trainee-assistants, as assistants, and otherwise as general practitioners at the latest convenient date this year and at comparable dates in previous years. Mr. IAIN MACLEOD stated that the most nearly comparable figures available for England and Wales were:

	Trainee General Practitioners	Assistants	General-practitioner Principals
July 1, 1952	369	1,689	18,164
,, 1, 1953	297	1,596	18,908
January 1, 1954	289	1,628	19,144

G.P.s in Hospital Appointments

Mr. A. BLENKINSOP asked the Minister of Health on November 8 how many clinical assistantships or other hospital appointments were held by general practitioners; what increase there had been in such appointments; and what encouragement was being given to regional hospital boards and management committees to make such appointments in suitable cases.

Mr. IAIN MACLEOD stated that on December 31, 1953, the latest date for which figures were available, the figure was 5,876 (excluding honorary appointments but including practitioners remunerated from bed funds), an increase of some 50% over December, 1949. He had no reason to suppose that hospital authorities were in any doubt about his views on the advantages to be derived from such appointments in suitable cases.

Flour Improvers Examined

Mr. HEATHCOAT AMORY, Minister of Agriculture and Food, said on November 8 in answer to Mr. N. DODDS (Dartford, Lab.) that he was not yet able to make a statement on the banning of agene as an improver in flour. Mr. DODDS said that it was 11 months since it had been said that a decision was to be made shortly. Since experiments on animals had shown terrible results, was it not time to protect human beings? Mr. AMORY said he could take the matter no further until he had had more technical advice. Up to date the evidence was that it was not toxic to human beings.

In reply to another question from Mr. DODDS, Miss PAT HORNSBY-SMITH, Parliamentary Secretary, replied that a purely factual report on the tests was received on March 12. The appropriate subcommittee of the interdepartmental Standing Committee on Medical and Nutritional Problems discussed it on April 27, and agreed that before they could pursue their discussions the Medical Research Council should be asked to examine it further. The subcommittee would meet again to discuss the report when the results of this further examination were available. Mr. DODDS repeated his demand for a decision in "this long business." Miss HORNSBY-SMITH said the report of the subcommittee was referred back to the Medical Research Council, as this was a matter for careful medical investigation. It was hoped that the report would be reconsidered by the subcommittee in mid-November.

Hospital Pay-beds

The MINISTER OF HEALTH, answering on November 8 question by Mr. A. BLENKINSOP about the number of pay-beds in hospitals and their proportion to the total number of hospital beds, stated that the number of beds designated under Section 5 of the Health Service Act at the end of 1951 was 6,286 (1.31% of total beds, excluding those not staffed); 1952, 6,229 (1.29%); and 1953, 6,153 (1.25%).

Clean Food Bill Completed

The Food and Drugs Amendment Bill arrived at the last stage of its long passage through Parliament on November 11, when it was given a third reading in the Commons by agreement, though not with universal satisfaction. It has to return to the Lords for their consideration of the Commons amendments before it receives the Royal Assent.

The dispute over compulsory registration of catering premises was fought out again in the concluding part of the committee stage, on a series of Opposition amendments. Mr. F. T. WILLEY (Sunderland, North, Lab.), a former Parliamentary Secretary at the Ministry of Food, claimed that the report of the working party on the catering trade was complete justification for the registration of catering premises with the local authority as "an essential administrative prerequisite of any real effort to improve hygienic conditions."

Dr. A. D. D. BROUGHTON (Batley and Morley, Lab.), seconding, described the Government's policy of prosecutions and penalties instead of registration as a tactless and brutal way of raising the standards of hygiene. He had been in touch with the National Caterers' Federation, the small caterers' organization, and found that, although it was originally opposed to registration, it was now willing to accept it, subject to safeguards, as the lesser of two evils. Sir HUGH LINSTEAD (Putney, Con.) argued against this that registration was not necessary to achieve the purpose.

Dr. HILL repudiated as entirely without foundation what had been a recurring theme during the committee debates, that there had been representations from the catering trade, that Lord Woolton had been associated with them, and that

the change in policy had been made as a consequence. On the proposals now made by the Opposition, he asked: (1) was it wise that a local authority should be required to appoint a committee and delegate to it the whole of its functions on registration?; and (2) was it right that the permission of such a committee should be necessary before the local authority could engage in a prosecution? His description of that was "a caterer's dream." The Government's change of attitude had come about when they considered the representations that were made about exclusion from registration: the small boarding house, the seaside house that became a catering establishment for a few weeks in summer, the moorland café. They had decided, in view of the difficulties of registration with such exclusions, that the important sanction should be the power to disqualify the premises, whatever they were. The second factor was that there was to be a wealth of new law, in the form of regulations; and in the Government's view a local authority ought not to be able to withdraw registration without being willing to prove an alleged offence in the courts.

The principal change made in the Bill was the addition of a new clause establishing a Food Hygiene Advisory Council. Mr. HEATHCOAT AMORY, Minister of Agriculture and Food, moved it to give effect to an earlier promise. He said the council would consist of a chairman and members appointed by Ministers, the members to be representative of employers and workers in the food trades and of the public. The clause empowered Ministers to put to the council for advice such matters as they thought fit, and required them to put to the council draft regulations dealing with labelling, hygiene, any orders extending registration, and the licensing of street traders. The council would in no way interfere with the direct consultations with the trade on technical trade matters. Dr. BROUGHTON secured acceptance of an amendment requiring that any code of practice should also be referred to the council. The new clause was agreed to.

Medico-Legal

STUCK TO HIS LAST

The Court of Appeal decided on November 10 not to upset the Minister of Health's decision that a shoemaker, Mr. T. J. Healey, employed by the Morgannwg Hospital Management Committee, was not a mental health officer.[1] Mr. Healey had appealed from a decision of Mr. Justice Cassels's refusing him a declaration that he was a mental health officer within the meaning of the National Health Service (Superannuation) Regulations, 1950,[2] and the court dismissed his appeal.

The patients at the hospital did shoemaking as occupational therapy, and Healey assisted the charge-hand in the workshop. If he were a mental health officer he would be entitled to better terms than he obtained. Under the regulations, said Lord Justice Denning in his judgment, he was a mental health officer if he devoted the whole of his time to the treatment or care of the patients. The Minister had decided that Healey did not come within that definition, and Healey was seeking to get the court to say that the decision was wrong.

If the Minister had made a palpable error, his Lordship thought the courts would have interfered. The present case was not of that kind. If the court were to grant the declaration sought, it would have to rehear the very matter which the Minister had decided—and there was no telling where it would stop. Every person who was disappointed with a Minister's decision could bring an action for rehearing. That would be going much too far. The courts had powers to see that the Minister did his work properly, but they should not seek to do it for him or to do it all over again.

Lords Justices Morris and Parker concurred.

[1] *The Times*, November 11.
[2] *British Medical Journal*, June 19, p. 1445.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **October 30** (No. 43) and corresponding week 1953.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1954					1953				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	8*	1	6	0		20	0	3	0	
Dysentery	424	38	204	5	6	267	43	136	3	4
Encephalitis, acute	1	0		0		3	0	0	0	
Enteric fever:										
Typhoid	6	0	1	1		4	1	2	1	2
Paratyphoid	16	1	2(B)	0		13	0	0	0	1
Food-poisoning	253	55		2		165	12		0	
Infective enteritis or diarrhoea under 2 years				12	10				14	47
Measles*	3,806	254	514	123	124	691	13	75	15	97
Meningococcal infection	28	2	6	2		31	1	13	1	1
Ophthalmia neonatorum	39	4	4	0		42	8	8	0	
Pneumonia†	368	24	141	1	2	333	28	107	5	
Poliomyelitis, acute:										
Paralytic	40	3	30	1	4	107	8	25	15	10
Non-paralytic	30	4				69	6			
Puerperal fever§	238	51	12	2		249	36	14	2	2
Scarlet fever	694	49	128	30	29	986	58	165	31	45
Tuberculosis:										
Respiratory	784	99	141	12				123	26	
Non-respiratory	112	13	18	9				27	2	
Whooping-cough	1,692	90	146	9	23	2,395	167	235	28	148

DEATHS in Great Towns	1954					1953				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	0	0	0	0	0	0	0			0
Dysentery	0	0		0		1	0			
Encephalitis, acute		0			0		0			0
Enteric fever	1	0	0	0		0	0			
Infective enteritis or diarrhoea under 2 years	4	0	1	0	1	7	2	1	0	1
Influenza	9	2	1	0	1	6	1		0	1
Measles		0	0	0	0		0			0
Meningococcal infection		0	0				0			
Pneumonia	157	20	16	11	6	115	15		9	0
Poliomyelitis, acute	2	0			0	3	0			0
Scarlet fever		0	0	0	0		0			0
Tuberculosis:										
Respiratory	75	9	4	1	6	89	7	9	3	6
Non-respiratory		0	6	0	0		2	2	0	0
Whooping-cough	1	0	0	0	0	2	0		1	0
Deaths 0–1 year	180	27	22	5	16	224	26	14	7	9
Deaths (excluding stillbirths)	4,788	696	491	121	140	4,520	656	522	85	135
LIVE BIRTHS	7,238	1151	840	204	353	7,813	1211	919	213	417
STILLBIRTHS	194	17	20			190	21	21		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

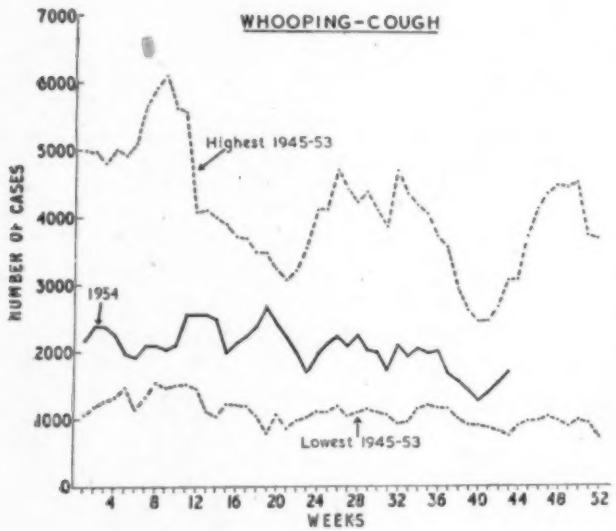
Vital Statistics

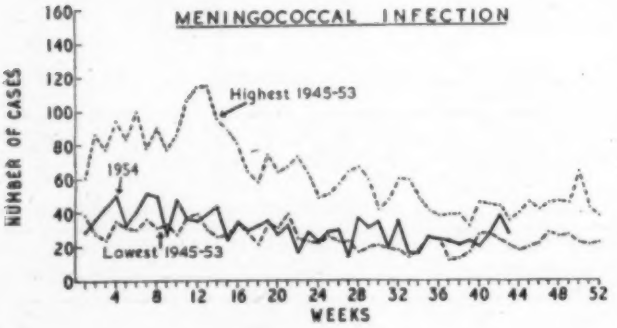
1953 Annual Report

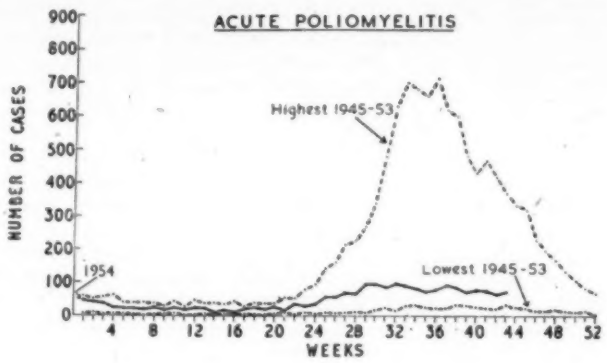
In England and Wales in 1953 the crude general death rate was 11.4 per million population, being 0.1 above the rate for 1952 and 0.4 above the rate for 1948, the lowest so far reported. The infant mortality rate of 27 per thousand live births reached a record low level. Deaths from lung cancer continued to increase, there being 12,881 in men and 2,251 in women. Deaths from leukaemia also continued to increase, numbering 1,116 in men and 1,005 in women. Mortality from disseminated sclerosis was rather lower for men and rather higher for women than in recent years, with 280 deaths of men and 511 of women. There were 192 deaths in aircraft accidents as compared with 311 in 1952, 296 in 1951, 240 in 1950, and 95 in 1949. Most of these deaths are in R.A.F. aircraft. Deaths from barbiturates continued to increase, there being 169 as compared with 140 in 1952, 117 in 1951, and 54 in 1946. 297 deaths were attributed to cataclysm and 14 to lightning.—*Registrar-General's Statistical Review of England and Wales for the Year 1953*, Part I, H.M.S.O., London, 10s.

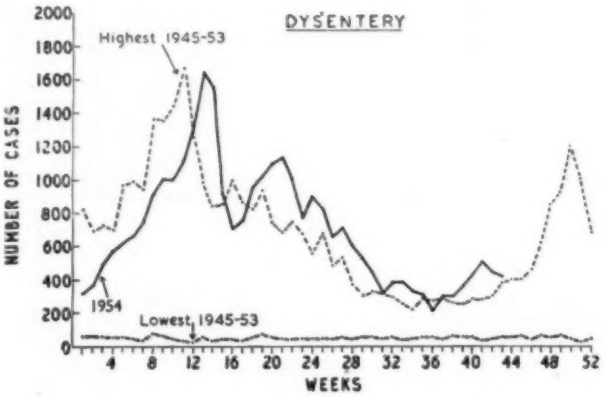
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1945–53 are shown thus - - - - - - -, the figures for 1954 thus ————. Except for the curves showing notifications in 1954, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









Infectious Diseases

The largest fluctuations in the trends of infectious diseases in England and Wales during the week ending October 30 were increases of 352 for measles, from 3,454 to 3,806, and 148 for whooping-cough, from 1,544 to 1,692, and a decrease of 55 for scarlet fever, from 749 to 694.

The largest rises in the local trends of measles were 88 in Yorkshire West Riding, from 216 to 304, 62 in Lancashire, from 1,373 to 1,435, 52 in Kent, from 25 to 77, 50 in London, from 204 to 254. The only large increase in the incidence of whooping-cough was 42 in Sussex, from 26 to 68. Only small variations were recorded in the trends of scarlet fever; the largest was a fall of 24 in Lancashire, from 114 to 90. 8 cases of diphtheria were notified, being 15 fewer than in the preceding week.

70 cases of acute poliomyelitis were notified; these cases were 1 more for paralytic and 7 more for non-paralytic cases than in the preceding week. The largest returns were Yorkshire West Riding 12 (Wetherby R.D. 3, Leeds C.B. 2), London 7 (Islington 2, Lewisham 2), Gloucestershire 5 (Cheltenham M.B. 3, Cheltenham R.D. 2), Derbyshire 5, Lancashire 5, and Middlesex 5 (Willesden M.B. 2).

A decline of 30, from 454 to 424, was reported in the number of notifications of dysentery. The largest centres of infection were Lancashire 114 (Oldham C.B. 31, Liverpool C.B. 26, Morecambe and Heysham M.B. 14), Yorkshire West Riding 53 (Sheffield C.B. 19, Huddersfield C.B. 13), Berkshire 49 (Newbury R.D. 49), London 38 (Islington 13), Lincolnshire 33 (Scunthorpe M.B. 27), Glamorganshire 20 (Cardiff C.B. 19), and Durham 17 (Easington R.D. 10).

Week Ending November 6

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 636, whooping-cough 1,953, diphtheria 14, measles 4,635, acute pneumonia 351, acute poliomyelitis 59, dysentery 468, paratyphoid fever 14, and typhoid fever 2.

Medical News

Sir Winston Churchill.—Many members of the medical profession will wish to show their appreciation of Sir WINSTON CHURCHILL's long and distinguished service to his country by subscribing to the Winston Churchill 80th Birthday Presentation Fund. Sir Winston will be 80 on November 30. Donations should be sent to the hon. treasurer, Lord MOYNIHAN, at 156, Charing Cross Road, London, W.C.2.

London Medical Exhibition.—Opening the London Medical Exhibition at the Royal Horticultural Society's hall in Westminster on November 15, Sir RUSSELL BRAIN, P.R.C.P., spoke of the enormous advances that had taken place in medicine during the last generation. Twenty-five or thirty years ago, in the treatment of poliomyelitis, for instance, all they had had to rely on were certain very simple medicaments and the help of the orthopaedic surgeons; all the rest had to be left to the patient's capacity for resistance. "When we see how lives are saved in poliomyelitis to-day," said Sir Russell Brain, "we find that we depend very often upon the use of respirators, new techniques of various kinds, bronchoscopy, *x*-rays of the lungs, and the use of antibiotics to anticipate and prevent pneumonia; also new types of splints and prosthetic devices. Thus in the treatment of a severe case of poliomyelitis we should depend upon a fair cross-section of the instruments, diagnostic aids, and therapeutic agents which are represented in this exhibition." Every major disease and its treatment was represented in cross-section in the exhibition, he went on. They were accustomed to look upon medicine as an art and as a science, but it was also to an ever-growing extent an industry—an industry which attracted to itself research and enterprise and team-work, and devoted itself to the highest service of mankind. Addressing the exhibitors, Sir Russell Brain said that all those who represented this great industry had, if he might put it so, "married into the family of medicine." Doctors welcomed this opportunity of thanking them for all their co-operation; they could not do without it, and he was sure this close association would continue to grow as the years went by.

Medical Women's Federation.—Two hundred members and guests attended the subscription dinner arranged by the London association for the council of the Medical Women's Federation on November 12. It was held in the Great Hall of the Royal College of Surgeons. The guests were received by Miss GWENDOLINE SMITH, president of the London association, jointly with Dr. ANNIS GILLIE, the Federation's president. The health of the Federation was proposed by Dr. ANGUS MACRAE, who spoke with sincerity and wit, not about the early pioneers, but about three modern medical women with whom he had day-to-day contact. Dr. GILLIE in reply, however, harked back to the beginnings of organized medical women—to the Association of Registered Medical Women, the forerunner of the present Federation. At the first dinner, held in 1880 at the "Trafalgar," Greenwich, there had been only nine diners, she said, but they formed a most distinguished company. The menu on that occasion was a long one, and included nine different kinds of fish. Dr. Gillie's speech was much appreciated by her hearers. The toast of "The Guests" was proposed by Miss DIANA BECK and Sir ZACHARY COPE responded.

New Hormones for Rheumatoid Arthritis.—At a meeting of the American Rheumatism Association on November 4 Dr. JOSEPH J. BUNIM is reported to have announced a small trial of two new hormones of the cortisone family, metacortandralone and metacortandrocin, both at present very scarce. Dr. Bunim is clinical director of the National Institute of Arthritis and Metabolic Disorders. According to the *New York Times* the hormones are claimed to be several times as active as cortisone and to produce less severe side-effects. Seven patients had been treated with metacortandralone and four with metacortandrocin.

Horror Comics.—The campaign against "horror comics" is gathering momentum. Last week the ARCHBISHOP OF CANTERBURY headed a deputation on the subject to the Home Secretary. The National Union of Teachers mounted an exhibition of the "comics" at their London headquarters, and persuaded the Minister of Education to visit it. On November 12 *The Times*, under the heading, "A Horrible Trade," devoted its first leading article to an examination of whether legislation is the right answer to the evil. "In the last resort," says the leader, "if legislation is the only way to protect the young from the people who are willing to indulge in this trade, then it should not be burked."

Industrial Benefits.—Details of extended benefits available for persons with uncomplicated pneumoconiosis, byssinosis, or skin cancer of industrial origin are contained in two recently printed Statutory Instruments (Nos. 1443 and 1444 of 1954, available from H.M. Stationery Office, price 6d. and 4d. respectively). The new benefits came into operation on November 8.

Drummond Fellowship for Research in Nutrition.—Applications are invited for this Fellowship, which was established in memory of the late Sir Jack Drummond. The value of the Fellowship is £900 per annum (to which may be added up to £50 for research expenses and £90 for superannuation), and it will normally be tenable for two years. Full particulars may be obtained from the hon. secretary, Drummond Trust, University College, Gower Street, London, W.C.1. The last date for applications is January 15, 1955.

Rectorship of Edinburgh University.—On November 12 Sir SYDNEY SMITH, until last year dean of the faculty of medicine and professor of forensic medicine at Edinburgh, was elected Rector of Edinburgh University. There were five candidates for the Rectorship, of whom Mr. PETER USTINOV, the playwright, critic, and actor, was the runner-up, gaining 739 votes to Sir Sydney's 1,097.

News in Brief.—Professor H. A. KREBS, F.R.S., Whitley Professor of Biochemistry at Oxford, has been awarded one of the Royal Society's two Royal Medals for his distinguished contributions to biochemistry. Last year Professor Krebs shared a Nobel Prize for medicine and physiology.

A SCOTTISH EPILEPSY ASSOCIATION has been formed as a result of a meeting in Glasgow on November 1 under the chairmanship of Sir HECTOR HETHERINGTON. Its aims are to promote research on epilepsy and to create a better understanding of the disease on the part of the public. Dr. J. B. GAYLOR, lecturer in neurology at Glasgow University, was appointed chairman of the executive committee.

Professor C. G. ROB, of St. Mary's Hospital, London, has been appointed honorary consultant in vascular surgery to the Army at home.

Dr J. G. M. HAMILTON, physician at the Royal Infirmary, Edinburgh, has been appointed principal medical officer of the Scottish Widows' Fund and Life Assurance Society in succession to Professor D. MURRAY LYON.

Dr. R. F. B. BENNETT, M.P., has been appointed Parliamentary Private Secretary to the Minister of Fuel and Power, Mr. Geoffrey Lloyd.

COMING EVENTS

Scientific Exhibition at Toronto Meeting.—Any practitioner wishing to exhibit in the Scientific Exhibition at the Joint Annual Meeting of the British and Canadian Medical Associations in Toronto next June is asked to communicate with the Secretary, B.M.A. House, Tavistock Square, London, W.C.1, as soon as possible.

Planned Parenthood.—Dr. PHILIP M. BLOOM, consultant to the Marriage Guidance Council, will lecture on the "Social and Practical Aspects of Planned Parenthood" at the London School of Hygiene and Tropical Medicine on November 26 at 5.30 p.m. Admission free without ticket.

Exhibition of Israeli Scientific Papers, 1948–53.—On December 7 an exhibition of papers by Israeli scientists, arranged by subjects and catalogued, will open for a fortnight at the Consulate of Israel, 18, Manchester Square, London, W.1. Admission free, from 10 a.m. daily except Saturdays.

Society of Medical Officers of Health.—Annual Dinner of Services Group at Central Mess, Royal Army Medical College, Millbank, London, S.W.1, at 7 p.m. on December 10. Tickets (one guinea excluding wines) from the administrative officer of the Society, Tavistock House, Tavistock Square, London, W.C.1.

Fourteenth British Congress of Obstetrics and Gynaecology.—In Oxford, July 27–30, 1955. Details from the Congress Secretaries, The Radcliffe Infirmary, Oxford. Open to all registered medical practitioners.

Third International Congress of Biochemistry.—The Congress will be held in Brussels, August 1–6, 1955. General Secretary, 17, Place Delcour, Liége, Belgium.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday, November 22

●INSTITUTE OF NEUROLOGY.—5.30 p.m., Sir Charles Symonds: Disturbances of Vision: Due to Lesions of the Optic Region and Calcarine Cortex.

●INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—At Queen Charlotte's Hospital, 4.30 p.m., Mr. D. MacLeod: Place of Caesarean Section in Modern Obstetrics.

MANCHESTER MEDICAL SOCIETY.—*Section of Odontology*: 5 p.m., Professor M. A. Rushton: Bony Enlargements of the Jaws. 9 p.m., *Section of General Practice*: Mr. A. Lawrence Abel: Some Common Diseases of the Rectum and Anal Canal.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—4 p.m., Professor D. M. Dunlop: Complications of Diabetes.

Tuesday, November 23

●BRISTOL UNIVERSITY.—At Reception Room, 8.30 p.m., Carey Coombs Memorial Lecture by Professor J. Crighton Bramwell: Diagnosis of Rheumatic Valvular Disease, 1924-1954.

BRITISH INSTITUTE OF RADIOLOGY.—6.30 p.m., ordinary meeting.

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Mr. V. E. Negus: Comparative Anatomy of the Larynx.

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. S. C. Gold: Contact Dermatitis.

OXFORD UNIVERSITY MEDICAL SOCIETY.—At Maternity Lecture Theatre, Radcliffe Infirmary, 8.15 p.m., Sir Adolphe Abrahams: Medicine and Sport.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—3.45 p.m., Erasmus Wilson Demonstration by Dr. L. M. Franks: Latent Carcinoma of the Prostate.

ST. MARY'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Mr. Kenneth Bowes: Gynaecology of Old Age.

ST. MARY'S HOSPITALS, Manchester.—At Large Lecture Theatre, Clinical Sciences Building, York Place, Manchester, 5 p.m., Lloyd Roberts Lecture by Professor N. B. Capon: Paediatrician's Part in the Maternity Services.

Wednesday, November 24

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. H. Haber: Keratoma, Senile and Intraepidermal Epithelioma.

●INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—At Hammersmith Hospital, 3 p.m., Professor T. N. A. Jeffcoate: Selection of Cases for Forceps Delivery.

INSTITUTE OF UROLOGY.—4.30 for 5 p.m., Dr. A. H. Harkness: Non-gonococcal Urethritis.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Dr. H. Weil-Malherbe: Blood Adrenaline in Relation to Mental Activity.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—3.30 p.m., Dr. F. Avery Jones: Social Aspects of Peptic Ulcer (illustrated).

ST. MARY'S HOSPITAL MEDICAL SCHOOL.—5 p.m., joint meeting of Paediatric Unit and Department of Psychological Medicine. Film: A Two-year-old Goes to Hospital.

Thursday, November 25

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Dr. R. I. S. Bayliss: Factors Influencing Adrenocortical Activity in Health and Disease.

HONYMAN GILLESPIE LECTURES.—At University New Buildings, Teviot Place, 5 p.m., Dr. Douglas Guthrie: The Monroes and the Foundation of the Edinburgh Medical School.

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. J. O. Oliver: Allergy and Immunity in Skin Diseases.

OXFORD UNIVERSITY.—At Nuffield Orthopaedic Centre, Wingfield-Morris Orthopaedic Hospital, 8.30 p.m., Sir Reginald Watson-Jones: Recurrent Dislocation of Joints.

ROYAL ARMY MEDICAL COLLEGE.—5 p.m., Dr. W. Ritchie Russell: Neuritis.

ROYAL EYE HOSPITAL.—5.30 p.m., Dr. T. H. Whittington: Lenses and Their Effects. The Fitting of Spectacles.

ST. ANDREWS UNIVERSITY.—At Medical School, Small's Wynd, Dundee, 5 p.m., Dr. C. Keith Simpson: Doctor's Part in Crime Investigation.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., psychiatry demonstration by Sir Paul Mallinson.

SURREY INTER-HOSPITAL PSYCHIATRIC ASSOCIATION.—At Belmont Hospital, Sutton, 8 p.m., film: Deep Insulin Coma Therapy, introduction by Dr. A. S. Thorley. Papers by Dr. M. N. Pai: Observations on the Nature and Treatment of Spasmodic Torticollis; Dr. F. O'Donnell Finigan: The Therapeutic Use of Leptazol in Psychiatry.

Friday, November 26

FACULTY OF RADIOLOGISTS.—At Royal College of Surgeons of England, 2 p.m., joint meeting with Section of Radiology, Royal Society of Medicine, Mr. J. B. Kinmonth, Mr. G. W. Taylor, and Dr. R. A. Kemp Harper: Lymphangiography by Radiological Methods; Dr. H. S. Bennett: Experimental Lymphography with Angiopac and its Effects on Lymphoid Tissue; Dr. C. J. Hodson: Retroperitoneal Gas Insufflation.

●INSTITUTE OF DERMATOLOGY.—5.30 p.m., clinical demonstration by Dr. I. Muende.

INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., clinical demonstration by Dr. N. C. Oswald.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY.—3.30 p.m., Professor F. C. Ormerod: Hoarseness; 6 p.m., Mr. T. G. Wilson: Surgical Anatomy of the Ear, Nose and Throat in Infancy.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Mr. Gordon Cruickshank: Carcinoma of the Bronchus.

●ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—5 p.m., Mr. John Hutchison: Recent Advances in the Surgery of the Oesophagus.

ROYAL MEDICAL SOCIETY, Edinburgh.—8 p.m., Dissertation by Mr. G. Melville-Mason.

Saturday, November 27

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.—At Royal Free Hospital, Gray's Inn Road, W.C., 2.30 p.m., Mrs. Eleanor French: Prostitution.

APPOINTMENTS

BLOOM, C. V., M.B., B.S., Chief Medical Officer, Dr. Barnardo's Homes.

MANCHESTER REGIONAL HOSPITAL BOARD.—W. H. Lloyd, M.B., Ch.B., M.R.C.P.Ed., Consultant Physician (Geriatrics) to the Oldham and District Hospital Centre; Janet B. Woodroffe, M.B., Ch.B., D.A., Assistant Anaesthetist, Preston Royal Hospitals.

NORTH-WEST METROPOLITAN REGIONAL HOSPITAL BOARD.—J. N. Milnes, M.D., M.R.C.P., Consultant Neurologist, West End Hospital for Nervous Diseases; W. E. S. Bain, F.R.C.S., Consultant Ophthalmologist, King Edward VII Hospital, Windsor; R. J. H. Smith, F.R.C.S., D.O., Consultant Ophthalmologist, Royal Northern Hospital; H. Grenville, M.R.C.S., L.R.C.P., F.F.A. R.C.S., Consultant Anaesthetist, Hendon District Hospital; J. G. Selwyn, M.D., Consultant Pathologist, West Middlesex Hospital; C. T. F. Ealand, M.D., M.R.C.O.G., Consultant Obstetrician and Gynaecologist, Windsor Group of Hospitals; H. S. Klein, M.D., D.P.M., Consultant Child Psychiatrist, West Middlesex Hospital; D. R. McPherson, M.B., Ch.B., D.T.M.&H., D.M.R.E., Assistant Radiologist (S.H.M.O.), Harefield Hospital; J. R. Mikhail, M.R.C.S., L.R.C.P., Medical Director (S.H.M.O.), Mass *X*-ray Unit 5B; J. A. F. Tobin, M.B., B.S., D.A., Assistant Anaesthetist (S.H.M.O.), West Herts Hospital; R. N. T. Higgins, M.B., B.Chir., D.P.M., Psychiatrist (S.H.M.O.), Child Guidance Clinic, Kilburn; D. I. Elizabeth Huban, M.R.C.S., L.R.C.P., Assistant Psychiatrist (S.H.M.O.), Royal Northern Hospital; S. M. Smith, M.B., B.Ch., D.M.R., Assistant Radiologist (S.H.M.O.), Barnet Group of Hospitals; J. L. Frazee, M.D., Dip.Psych., Assistant Psychiatrist (S.H.M.O.), Child Guidance Training Centre, N.W.; C. F. Cooper, M.D., M.R.C.P., Consultant Physician, Royal Northern and Wood Green and Southgate Hospitals; K. B. Gibson, M.D., M.R.C.P., Consultant Geriatrician, St. Albans City, Abbots Langley, and Luton and Hitchin Hospitals; I. A. Donaldson, M.B., B.S., F.R.C.S., M.R.C.O.G., D.A., Consultant Obstetrician and Gynaecologist, City of London Maternity Hospital and Clinic.

TONGE, W. L., M.D., D.P.M., Deputy Medical Superintendent (with consultant status), Cheadle Royal Hospital for Mental Diseases, Cheadle, Cheshire.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Dobson.—On November 9, 1954, at Farnborough Hospital, Kent, to Margaret, wife of Dr. D. J. Dobson, of Christchurch, New Zealand, a daughter—Sandra Jane.

Harman.—On November 7, 1954, at Durban, South Africa, to Joy, wife of Michael J. Harman, M.B., B.S., a daughter—Louise Ellen.

Jarratt.—On November 2, 1954, at King's College Hospital, London, S.E., to Mary, wife of Dr. E. W. Jarratt, a son.

Sears.—On November 10, 1954, at Barony Hospital, Nantwich, Cheshire, to Dr. Janet Sears (formerly Conn), wife of Dr. H. T. N. Sears, a son.

Stock.—On November 5, 1954, at St. Mary's Hospital, Portsmouth, Hants, to Freda (formerly Lunt), M.B., Ch.B., D.C.H., wife of Dr. Stuart Stock, F.R.C.S.Ed. a son—Douglas Guy.

DEATHS

Archer.—On October 27, 1954, at Finchley Memorial Hospital, London, N., Edward William Archer, M.B., B.S.

Berrie.—On October 26, 1954, at St. Annes-on-Sea, Lancs, Alexander Robert Berrie, M.B., Ch.B., aged 75.

Dixon.—On October 28, 1954, at 8, Maresfield Gardens, Hampstead, London, N.W., Gerald Conroy Dixon, M.B., F.R.C.S.Ed., D.O.M.S., aged 65.

Dods.—On October 12, 1954, in a nursing-home, Malcolm Cecil Gillies Dods, M.B., Ch.B., of Sandringham, Johannesburg, South Africa.

Edwards.—On October 26, 1954, at Rutland Private Nursing Home, Langham, Rutland, Edgar Steele Edwards, M.R.C.S., L.R.C.P., of 17, Roman Bank, Stamford, Lincs, formerly of Empingham, Rutland, aged 79.

Hart.—On October 23, 1954, at 87, Priory Road, London, N.W., Johannes Hart, M.D.

Higson.—On October 26, 1954, at Forest Hill, London, S.E., John Russell Higson, M.B., C.M., D.P.H., aged 87.

Hoseason.—On October 23, 1954, at The Oaks, Hurstbourne Tarrant, Andover, Hants, Arthur Sandford Hoseason, M.D., M.R.C.P., D.P.H.

Jameson.—On October 27, 1954, at Glengiblin, Mallow, Co. Cork, John Bland Jameson, C.I.E., M.B., C.M., Lieutenant-Colonel, I.M.S., retired, aged 90.

Malcolm.—On October 25, 1954, at his home, 3, York Road, New Barnet, Herts, Alan Samuel Lack Malcolm, M.R.C.S., L.R.C.P.

Vere-Hodge.—On October 26, 1954, at Canonbury House, Tisbury, Wilts, Reginald Felix Vere-Hodge, M.D.

Wilson.—On October 27, 1954, at Springfield, Wareham, Dorset, Allan Read Wilson, M.D., aged 78.

Any Questions ?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Vaccines and the Common Cold

Q.—*Are there any vaccines now available that are effective in preventing or alleviating the common cold? Are the various oral vaccines one hears about any good for this purpose? What are the prospects for a successful vaccine?*

A.—No, there are no effective vaccines so far as the common cold infection itself is concerned. Antibacterial vaccines may be of value against secondary infections, but there is no good justification for using them in a widespread manner. No new work has indicated lines on which a successful vaccine is likely to be developed soon. There is no scientific basis for using oral vaccines against colds.

What is a Stillbirth ?

Q.—*In a recent maternity case intrauterine death of the foetus occurred at 26 weeks. The macerated foetus was not expelled until a further 8 weeks had elapsed. The local health authority considered this notifiable as a stillbirth, although the foetus had never been viable and died before the 28th week, issuing forth after 34 weeks' amenorrhoea but only 26 weeks' pregnancy. What is the legal position?*

A.—The Births and Deaths Registration Act, 1926, says, "Stillborn and stillbirth shall apply to any child which has issued forth from its mother after the 28th week of pregnancy and which did not at any time after being completely expelled from its mother breathe or show any other signs of life." A rigid interpretation of this law, and the provisions of the Public Health Act, 1936, justify the Local Health Authority demanding the notification of the birth of a macerated foetus after a pregnancy lasting 34 weeks irrespective of how long it has been dead *in utero*. Such an interpretation also means that the degenerated tiny foetus of a carneous mole, and the shrivelled and almost unrecognizable (and sometimes unrecognized) foetus papyraceus, measuring 2 or 3 in. (5–8 cm.) in length, extruded at term along with its surviving brother or sister, should also be notified, registered, and buried as stillbirths. By custom if not tradition such products of conception are rarely treated in this way.

The issue depends on whether "pregnancy" in the Act refers to 28 weeks of foetal life and development or whether it means the presence of products of conception in the uterus for 28 weeks. From the standpoint of medical practice the harbouring of products of conception of any kind—even a hydatidiform mole without a recognizable foetus—is regarded as a state of pregnancy. Nevertheless, when the foetus dies *in utero*, medical authority makes a clear distinction between "missed abortion" and "missed labour"—according to the viability of the child at the time of its death and not according to the time at which it is ultimately delivered. It remains doubtful, however, whether this attitude would be accepted by a Court of Law if the issue were ever put to the test.

A literal interpretation of the 1926 Act also raises another difficulty. Does the duration of pregnancy refer to 28 weeks' amenorrhoea (equivalent to approximately 26 weeks' pregnancy) or to 28 weeks after the time of conception, which can only be assumed? Here it should be recognized that the medical practitioner and midwife, for the purposes of clinical practice and certification, almost invariably calculate "the 28th week" as being approximately 12 weeks before the expected date of confinement—on the false supposition that pregnancy lasts 40 weeks. There is confusion in the matter of live birth, too. A foetus which is born at the 26th week of pregnancy and which happens to survive is undoubtedly a live birth even though it may not be viable by definition. Then what of the foetus which moves its limbs for a few minutes or hours after being extruded at the 12th week of pregnancy? This shows "signs of life" and strictly should be regarded as a live birth. There can be few if any medical practitioners who would not treat it as an abortion.

It may be that Statute law makes no special provision for a foetus remaining *in utero* for a significant time after its death. In such case, and as so often in English law, it becomes necessary for the courts or other persons concerned to interpret the Act in accordance with common sense, medical knowledge and usage, and the circumstances of individual cases. Unless the local health authority concerned in this question is prepared to adopt such an outlook, it would appear likely to get into difficulties over its statistics in regard to abortion and stillbirth if not over other matters, especially as the examples quoted above make it clear that, in practice, the Act is not being literally interpreted in several other respects, nor has it ever been.

It may be added that the issues raised by this question are becoming more and more important in present-day practice because of the financial repercussions about which the lay public is becoming increasingly aware. They affect, for example, certification for the purposes of securing maternity benefits. A patient's husband recently laid a complaint against the medical staff of a hospital on the grounds that his child had been registered as a stillbirth whereas he had heard a rumour that its heart was audible at birth. His concern was that this deprived him from claiming income-tax rebate to which he would have been entitled had the child been certified as being born alive and dying in the neonatal period. If this is so, what of the 12-weeks foetus showing signs of life?

It would look as though the laws and regulations in these respects are in need of revision, but meanwhile it is to be hoped that it will be recognized that abortion, stillbirth, and live birth are often matters of opinion rather than clearly defined and easily recognized states.

Contraindications to Contact Lenses

Q.—*Is there any contraindication to the use of contact lenses for cosmetic purposes in a young woman with a mild to moderate myopia?*

A.—If the young woman in question were reasonably skilful and patient in learning the processes of inserting and removing contact lenses, the only important contraindication to their use would be the presence of some irritating or inflammatory condition such as would render her intolerant of the foreign bodies placed in front of her eyes.

Inheritance of Schizophrenia

Q.—*What are the chances of a schizophrenic (male) having schizophrenic offspring? He is the only known case in the family on either side. What are the chances of his brothers or sisters having schizophrenic children?*

A.—The general expectation of schizophrenia occurring in the child of a schizophrenic is given by Kallmann (*The Genetics of Schizophrenia*, New York, 1938) as 11.9%. It depends, however, on the clinical type of the illness in the parent: the expectation is highest (17.3%) in the children of hebephrenics, nearly as high in the children of catatonics (16.2%), but much lower in the children of paranoid patients (8.5%) and the children of patients suffering from schizophrenia simplex (1.8%). All these figures have a margin of error from sampling, and the last is probably unreliable, as the numbers are too small. If these exceptions are being related to some particular individual, then the age of that individual should be taken into account together with the distribution of ages of onset in schizophrenia and the age of onset in the case of the particular schizophrenic involved

in the inquiry. These factors may make a very great difference, in the sense of reducing the expectation for an individual who has already advanced into adult life without becoming schizophrenic.

The general expectation of schizophrenia among nephews and nieces of schizophrenics is given by the same authority as 3.0%; but if both parents are mentally healthy the risk is only 1.3%. This may be compared with an expectation of 0.8% for the average member of the general public. For all practical purposes, therefore, the children of healthy parents who are also nephews or nieces of a schizophrenic may be regarded as not endangered. More recent work than that quoted has added to knowledge of risks for other relatives of schizophrenics, especially twins, but has not superseded the figures given above.

Fleas

Q.—*Is there any preparation which will kill fleas, as D.D.T. appears to be ineffective? If fleas are picked up when visiting dirty houses, how quickly can they breed and what numbers are produced?*

A.—It is to be hoped that D.D.T. (dicophane) is *not* ineffective against fleas, because 10% D.D.T. powder is reported on very favourably as a method of combating plague in the monograph on that disease by Pollitzer published by the World Health Organization (1954). It is true that D.D.T. is slow in action and has no repellent effect. Fleas contaminated with D.D.T. may live for a few hours; but they would soon become incapable of feeding or laying eggs. One ounce (30 g.) of D.D.T. powder rubbed into the underwear should kill any fleas picked up during the following week. The same would probably be true of powder containing 0.5% *gamma* B.H.C. (gammabenzene hexachloride), which is slightly odorous, or 1% pyrethrins. If a repellent is required, it might be worth smearing the cuffs, socks, and trouser openings with undiluted dimethylphthalate.

A few fleas picked up in dirty houses are unlikely to start infestations in clean ones, because the larval stages are small maggots which thrive only in dirt and debris. A helpful article in the larval diet is the partly digested blood voided by adult fleas. If a heavily infested person comes to live in a clean house, a colony may be started in the bedroom, particularly if the bedding or floor beneath the bed is not regularly cleaned. Under favourable conditions a flea colony may multiply quickly, for the females may lay several hundred eggs. Under warm summer conditions, a new generation would emerge in about a month; at lower temperatures this period would be considerably longer.

Leucocytes in Infants and Children

Q.—*How does the leucocyte count in infants differ from that of older children and adults? How does it alter in infections? What are the common causes of leucocytosis in infants, and particularly of an absolute increase in lymphocytes?*

A.—The total leucocytes fall rapidly from about 18,000 per cubic mm. at birth to about 14,000 two days later. There is then a rise, at first sharply and then more slowly, to about 17,000 at 12 days; from then onwards during the next few years the count falls to the adult figure. At the age of 1 year the count is usually at the 10,000–11,000 level. The polymorphonuclear leucocytosis present at birth declines in the first week to about 4,500 polymorphs per cubic mm. and thereafter remains approximately at the adult level. Lymphocytes, however, rapidly increase after birth, reaching a maximum at about the twelfth day; they decline slowly, reaching the adult level at about 12 years. At 1 year the lymphocyte figure is approximately 6,000–7,000 per cubic mm.

The causes of leucocytosis in infants are the same as in adults, although sometimes the polymorphonuclear leucocytosis is replaced by a lymphocytosis. As will be noted from what has been said above, an absolute lymphocytosis compared with adult levels is present for the first few years of life. The list of diseases possibly causing lymphocytosis in infants is large, whooping-cough and infectious lymphocytosis being well-known causes of high counts.

Atmospheric Pressure and the Blood Pressure

Q.—*Have any observations been made upon the effects of atmospheric-pressure variations on human blood pressure? I have a patient, on three injections of hexamethonium bromide daily, with a scientific husband who has worked out over several weeks curves which seem to show some connexion. I would like to know if this is recognized and described.*

A.—Blood pressure as measured is, of course, the pressure above atmospheric. So far as is known the readings are uninfluenced by small fluctuations in atmospheric pressure. Blood pressure in both normal and hypertensive patients remains unchanged at sea level and at high altitudes. Casual blood pressure readings in hypertensives are liable to very considerable fluctuations from time to time on the same day, and any correlation of occasional readings with the barometer reading is likely to be fortuitous.

Rights of a Medical Witness

Q.—*Is a medical witness permitted to comment in court on the results of urine or blood-alcohol tests which he has not personally performed? Defending counsel recently challenged my right to do so.*

A.—A medical practitioner appearing in court as an expert witness may comment if invited to do so on any medical aspect of the case. Whether he should do so must depend on the extent of his familiarity with the subject in question and whether he has sufficient information to form a justifiable basis for an opinion.

NOTES AND COMMENTS

Local Analgesics and Scalds.—Dr. A. E. FINCKH (Mosman, Australia) writes: With reference to this question in "Any Questions?" (August 7, p. 374) soak cotton-wool, or the like, in alcohol or methylated spirit and apply to the scald or burn. The pain ceases as if by magic. I learned this 50 years ago in a pathology laboratory in Vienna. I have used it in my home and in my laboratory ever since. It has never failed.

Refresher Course Books.—Copies of the first two volumes of collected articles from the Refresher Course for General Practitioners published in the *Journal* are still available at 25s. (postage 1s.) each. The first volume contains 55 articles and the second 60. Each article has been revised and brought up to date by its author.

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